



DIVISION OF BIRDS  
SMITHSONIAN INSTITUTION

# SMITHSONIAN MISCELLANEOUS COLLECTIONS

VOLUME 145



"EVERY MAN IS A VALUABLE MEMBER OF SOCIETY WHO, BY HIS OBSERVATIONS, RESEARCHES,  
AND EXPERIMENTS, PROCURES KNOWLEDGE FOR MEN"—JAMES SMITHSON

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SYSTEMATIC NOTES  
CONCERNED WITH THE  
AVIFAUNA OF PANAMÁ

By

ALEXANDER WETMORE

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# SYSTEMATIC NOTES CONCERNED WITH THE AVIFAUNA OF PANAMÁ

By ALEXANDER WETMORE

*Research Associate  
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The observations and descriptions included in the following pages have come to attention during detailed studies of the birds of the Isthmus of Panamá and their comparison with forms from other tropical areas. They are based in the main on the collections of the United States National Museum, with addition of specimens seen in the course of work at other institutions.

## I. GEOGRAPHIC VARIATION IN THE BLACK VULTURE, *CORAGYPS ATRATUS* (BECHSTEIN)

Opinion on recognition of races in the black vulture has varied from treatment of the entire population as undivided throughout the vast range, from southern United States south through Central America and South America to southern Chile and Argentina, and recognition of two races, one northern and one tropical, based on difference in size. The latter view has been abandoned currently in the main since a study by Friedmann (1933, pp. 187-188) in which he compared average size of North American birds with a small series from southern South America to find that the wing measurements appeared too similar to warrant separation. In the course of studies during recent years I have had opportunity to examine approximately 130 black vultures in various collections in the United States and to assemble a series of measurements that verify the findings of Brodkorb (1944, pp. 115-121) that three size groups are present, a smaller population in the tropical area and two larger ones in the temperate regions to the north and south on either side. Brodkorb was uncertain as to the nomenclature to be used since he could not distinguish between the two larger groups, which he therefore treated under one name. The extensive material that I have seen has justified the recognition of 3 races, as follows:

### **CORAGYPS ATRATUS ATRATUS (Bechstein)**

*Vultur atratus* Bechstein, in John Latham's Allg. Uebers. Vögel, Bd. 1, Anh., 1793, p. 655. (Florida.)

*Vultur urubu* Vieillot, Hist. Nat. Ois. Amér. Sept., vol. 1, Sept. 1807, p. 23, pl. 2. ("Carolines . . . Florides et . . . pour patrie la Zone torride"—Carolina and Florida; cf. A. O. U. Check-list North Amer. Birds, ed. 3, 1910, p. 153.)

*Characters*.—Size large; light markings on undersurface of primaries less extensive; wing ♂ (32 specimens) 414-445 (426); ♀ (28 specimens) 414-438 (426).

Resident from the mountains of northeastern Sonora (Sásabe, Moctezuma), western Texas, eastern Oklahoma, southeastern Kansas, Missouri, southern Illinois, southern Indiana, central Ohio (northern Licking County), eastern West Virginia, and Maryland south to the lower Rio Grande Valley in Texas (Brownsville), Louisiana, the Gulf coast, and Florida. The breeding range in recent years has been extended slowly along the northern boundary, with stragglers recorded casually to Nebraska, the Dakotas, and southern Ontario, eastward to southwestern Quebec, Maine, and Nova Scotia.

A male from Guadalajara, Jalisco, with the wing 415 mm., seems to indicate that this large northern form extends south from the international boundary through the plateau region of México and the adjacent mountain areas. In this same connection Col. L. R. Wolfe has pointed out to me some interesting data concerned with egg size in these birds. Three sets comprising 6 eggs in his collection from La Laja, in northern Veracruz, on the coastal plain about 40 miles south of Tampico, Tamaulipas, average  $73.5 \times 48.4$  mm., which agrees closely with an average of  $74.3 \times 50.1$  mm. for 21 eggs in 11 sets in the U. S. National Museum from Texas and Florida. As eggs of the subspecies of true tropical range are smaller, as will be shown under that race, there is indication that the northern form may range into northeastern México, though this requires check whenever skins from that area may be available.

#### CORAGYPS ATRATUS BRASILIENSIS (Bonaparte)

*Cathartes brasiliensis* Bonaparte, Consp. Gen. Avium, vol. 1, pt. 1, 1850, p. 9. ("ex Amer. merid. Antill." "Brasil merid." designated by von Berlepsch, Nov. Zool., vol. 15, 1908, p. 289; hereby further restricted to Rio de Janeiro, Brazil.)

? *Cathartes (vultur) urbis incola* "Ricord," Lesson, Compléments de Buffon, ed. 2, 1838, p. 93. (Indes occidentales . . . Santo Domingo, . . . bords de l'Orenoque . . . port d'Espagne . . . Saint-Vincent, à Saint-Lucie, à la Dominique et à la Santiago-de-Cuba.)

? *Cathartes urbicola* Des Murs, Rev. Mag. Zool., 1853, No. 4, p. 153. (Based on Lesson, 1838, above.)

? *Cathartes Ricordi* Des Murs, Rev. Mag. Zool., 1853, No. 4, p. 153. (Alternate name for *C. urbicola*.)

? *Vultur urbis-incola* "Riccord," Cassin, U. S. Expl. Exped., Mamm. and Ornith., 1858, p. 81. (Based on Des Murs, 1853, above.)

*Characters*.—Size small; light markings on underside of primaries more extensive and clearer white; wing ♂ (17 specimens) 386-410 (401); ♀ (23 specimens) 388-413 (400).

Resident in the tropical zone; in México, along the Pacific coast from southern Sonora (Camoá on the lower Río Mayo), and on the eastern side from southern San Luis Potosí (Bledos, Xilitla) southward throughout Central America; and in South America on the west to the coastal region of Perú (Lima), and on the east to the lowlands of Bolivia (Buenavista, Santa Cruz), and southern Brazil.

The southern limit from the material seen is uncertain but appears to include most of Brazil. The small size is constant throughout this vast range. It appears desirable to pinpoint restriction of type locality from that proposed by von Berlepsch to Rio de Janeiro in the southern part of that great country. Two specimens in the U. S. National Museum from the Federal District are typical in small size. It is possible that the next race may be found along the far southern boundary since this is the form of Paraguay.

With regard to egg size in this race, Colonel Wolfe writes that 7 eggs (in 4 sets) in his collection from Trinidad average  $70.1 \times 49.4$  mm. A set of 2 in U. S. National Museum, collected at Lagoa Santo, Minas Gerais, by E. G. Holt, measures  $70.4 \times 48.4$  and  $68.6 \times 48.8$  mm. These figures are definitely less than those listed above for the typical race.

*Cathartes urbicola* of Des Murs (1853, p. 153), listed in the synonymy above, is based on an account of "le Catharte citadin" given by Ricord to Lesson and published by the latter in the second edition of his *Compléments de Buffon* (Lesson, 1838, p. 93). The bird described by Ricord is a composite based in part on the black vulture, and in part on the turkey vulture, but with the size of a condor as it is said to be 48 inches tall. It is described as inhabiting the Spanish settlements in the West Indies, Trinidad, and on the Orinoco, where it was protected by the authorities as a scavenger. Lesson in a footnote gave it the name "*Cathartes (vultur) urbis incola*, Ricord," which was cited by Des Murs (p. 147) as "*Cathartes urbis incola* (Ricord) Lesson." Cassin (1858, p. 81) lists this under *Cathartes urbicola* Des Murs as "*Vultur urbis-incola*, Riccord." Des Murs also in the original citation wrote *ricordi* as an alternate name, his statement being as follows: "Jusque-la nous croyons devoir proposer pour le nom de ce Catharte, en tant qu'on le maintiendrait

dans le série comme espèce douteuse ou à étudier, soit le nom de *Cathartes urbicola*, soit encore mieux celui de *Cathartes Ricordi*."

While the black vulture undoubtedly is one of the birds to which these citations refer, the details of the accounts include the turkey vulture and possibly the condor in such a mixture that the names are of uncertain application. The earliest valid name is *brasiliensis* Bonaparte of 1850.

#### CORAGYPS ATRATUS FOETENS (Lichtenstein)

*Cathartes foetens* Lichtenstein, Verz. Ausgest. Säug. Vögel Zool. Mus. Berlin, 1818, p. 30. (Based on "Iribu Azara"; Paraguay; restricted to Asunción, Paraguay, by Brodkorb, in 1944.)

*Characters*.—Size similar to that of *C. a. atratus*, but light markings on under surface of primaries more restricted, the under wing definitely darker than in the two more northern races. Wing, male (10 specimens) 412-437 (421), female (5 specimens) 416-422 (419).

Resident in the Andes from northern Ecuador (Quito) to northern Bolivia (Cochabamba); in Chile, south to Aysen; Paraguay, including the Chaco, from the north-central section (Horqueta, 200 kilometers west of Puerto Casado), and Argentina south to the Río Negro; probably through Uruguay (no specimens examined).

The large size of the southern group has been the main cause of confusion in recognition of races in this species, since when birds of southern South America have been examined they have not appeared separable from northern representatives of equivalent measurements. This misunderstanding has completely overshadowed the vast tropical population of uniformly small dimension. The true status was clearly outlined by Brodkorb (1944, pp. 115-121), but his analysis has been disregarded since he applied the name of the nominate race to the large birds of both north temperate and south temperate areas in spite of their wide separation by another form.

With regard to eggs, Colonel Wolfe writes that a set of 2 from Argentina in his collection measures  $74.5 \times 45.0$  and  $72.0 \times 47.0$ , and that the average of 54 eggs taken in Chile, according to figures furnished by A. W. Johnson, is  $72.58 \times 49.5$  mm. These figures are close to the sizes found in the typical race of the north.

#### II. THE CRESTED BOBWHITE, *COLINUS CRISTATUS* (LINNAEUS), OF WESTERN CHIRIQUÍ

The quail of Panamá, described as *Colinus cristatus panamensis* by Dickey and van Rossem, is locally common from western Veraguas through Coclé to the western area of the Province of Panamá. To the south it ranges down the eastern side of the Azuero Peninsula



through Herrera and Los Santos, including the valley of the Río Tonosí. There have been few records for the Province of Chiriquí until recently, when I found crested bobwhites in small numbers in the coastal lowlands between Alanje and Puerto Armuelles, as well as near Boquete. The birds of this region are an isolated population separated by a considerable area, where no quail are known, from the main group of the species in the Republic. The bird of Chiriquí differs so decidedly in coloration that it requires recognition as another form.

**COLINUS CRISTATUS MARIAE** subsp. nov.

*Characters.*—Similar to *Colinus cristatus panamensis* Dickey and van Rossem<sup>1</sup> but decidedly darker, the markings of the upper surface blacker, and the black areas of the lower surface more extensive in both sexes; darker than any other population of the species.

*Description.*—Type, U.S.N.M. No. 471174, male adult, from 7 kilometers south of Alanje, Province of Chiriquí, Panamá, collected March 8, 1960, by A. Wetmore (original number 23600). Forehead, lores, a narrow feathered area surrounding the eye, and side of head down to the ramal area, dull white; shorter anterior feathers of the narrow, elongated crest pale drab-gray, the longer ones fuscous, tipped, and spotted irregularly along the edges, with drab; a broad superciliary extending from above the middle of the eye back to the side of the nape behind the auricular region mikado brown, lined irregularly with black; crown black, edged narrowly with white and adjacent to the superciliary with bright brown; auricular area dull olive-buff; black of crown extended down over nape, hindneck, and sides of neck, to extreme upper back, and spotted rather irregularly with white; feathers of back, scapulars, tertials, wing coverts, rump, upper tail coverts, and tail black, freckled with fine markings of fawn color, grayish white, and white, the inner secondaries edged, and the wings spotted more prominently, with dull white; primaries dull mouse gray, with the edge of the outer web and the tip of both webs varied from dull white to tilleul-buff; chin drab-gray; throat, foreneck, and sides of upper neck, below auriculars, russet; base of neck black, spotted with white and irregularly with russet, changing across upper breast to sayal brown, with each feather banded basally with white and medially with black below the brown tip to produce an appearance of irregular spotting; abdomen pinkish buff, with partly concealed bars of dull black, spotted with white and pinkish

<sup>1</sup> *Colinus leucotis panamensis* Dickey and van Rossem, Condor, vol. 32, No. 1, Jan. 20, 1930, p. 73. (Aguadulce, Coclé, Panamá.)

buff; under surface of wings mouse gray, with the under wing coverts tipped and edged lightly with dull white. Bill black; tarsus and feet dusky neutral gray (from dried skin.)

*Measurements.*—Males (6 specimens), wing 92.6-95.3 (93.7), tail 46.3-52.3 (49.2), culmen from cere 12.7-13.9 (13.2), tarsus 27.9-29.1 (28.5) mm.

Females (3 specimens), wing 92.0-96.1 (94.0), tail 45.7-50.0 (48.4), culmen from cere 12.4-13.4 (12.8), tarsus 27.2-29.4 (28.5) mm.

Type, male, wing 93.3, tail 52.3, culmen from cere 13.0, tarsus 27.9 mm.

*Range.*—Western Chiriquí on the southern slopes of the Volcán de Chiriquí near Boquete (El Salto, 1,350 meters elevation), and Francés near El Banco; and on the coastal plain below Alanje. Apparently restricted in distribution but fairly common when it is found.

*Remarks.*—The crested bobwhite of Panamá has been known principally from Veraguas and Coclé, with few specimens in museum collections from Chiriquí. Present information indicates that the population in Chiriquí is isolated as it is known only from the western part of the province, and there are no records of the related race *Colinus cristatus panamensis* beyond a point about 10 kilometers west of Soná in western Veraguas. From this western limit the subspecies *panamensis* is recorded in open country eastward to the western sector of the Province of Panamá (where I have found it near Nueva Gorgona, and 10 kilometers east of Bejuco), and south on the eastern side of the Azuero Peninsula through Herrera and Los Santos to Pedasí and near the Río Oria below Los Asientos; also in the lower Tonosí valley. It is evident that the additional race here described is one of restricted range, since it is reported to date only from three localities in an area between 50 and 60 kilometers in length. As I have been long familiar with the brown subspecies *panamensis* of farther east in the Republic the much darker coloration of the form here described was immediately evident on my first sight of it in life. It marks the western extension of the species *cristatus*.

The new form is named for Mrs. Robert A. Terry, who as Mary E. McLellan Davidson, through her studies in field and laboratory, has added much to our knowledge of the bird life of the Province of Chiriquí.

III. AN ADDITIONAL RACE OF THE CHESTNUT-BACKED ANTBIRD, *MYRMECIZA EXSUL* SCLATER

The chestnut-backed antbird, found widely through the tropical lowlands of the Republic of Panamá, is a forest-inhabiting species that still remains in small numbers in inhabited sections since a part of its haunt is in swampy woodlands where the land is too wet to be available for cultivation. Here it still finds suitable habitat when the surrounding forest has been destroyed. Three subspecies have been recorded from Panamá. A detailed study of the series now available from the entire isthmus has indicated a fourth that requires description.

**MYRMECIZA EXSUL NIGLARUS** subsp. nov.

*Characters.*—Similar to *Myrmeciza exsul exsul*,<sup>2</sup> but paler above and below; darker than *M. e. occidentalis* Cherrie,<sup>3</sup> especially in the female.

*Description.*—Type, U.S.N.M. No. 423427, male, from the Río Chimán about 10 kilometers above Chimán, Province of Panamá, collected February 20, 1950, by A. Wetmore and W. M. Perrygo (original number 15208): Crown, sides of head, throat, and foreneck black, shading to dark neutral gray on hindneck; rest of upper surface Mars brown, shading to russet on rump and upper tail coverts; rectrices fuscous, edged with russet; bend of wing black, edged with white, the alula being fuscous-black with the outer webs edged with white; lesser wing coverts with a shaft line of dusky neutral gray, terminating in a slightly expanded tip of the same color; primaries and secondaries fuscous-black, with the outer webs Mars brown, except the outermost, which has a narrow white outer edge; black of foreneck shading progressively to deep neutral gray on chest, and neutral gray on lower breast; under wing coverts dusky neutral gray, mixed scantily with white; posterior part of sides, flanks, and under tail coverts cinnamon-brown. Bill black; feet fuscous-brown (from dried skin).

*Measurements.*—Males (15 specimens), wing 65.0-70.1 (67.1), tail 42.5-49.7 (45.7), culmen from base 20.2-22.3 (21.4), tarsus 27.5-29.7 (28.4) mm.

<sup>2</sup> *Myrmeciza exsul* P. L. Sclater, Proc. Zool. Soc. London, vol. 26, 1858 (Jan.-May 1859), p. 540. ("Panama," type locality hereby restricted to near Gatun, Canal Zone.)

<sup>3</sup> *Myrmeciza immaculata occidentalis* Cherrie, Auk, vol. 8, No. 2, April 1891, p. 191. (Pozo Azul de Pirris, Pacific slope of Province of San José, Costa Rica.)

Females (10 specimens), wing 62.7-67.0 (64.2), tail 40.2-47.6 (43.3), culmen from base 19.9-22.2 (20.8), tarsus 26.4-29.6 (28.1) mm.

Type, male, wing 66.8, tail 42.5, culmen from base 20.7, tarsus 28.2 mm.

*Range*.—Eastern Panamá; on the Pacific slope from the western end of the Cerro Azul east through the Province of Panamá to western Darién; on the Caribbean slope from the upper Chagres Valley, above Madden Lake (Quebrada Candelaria on the Río Pequení, Quebrada Peluca on the Río Boquerón), and western Comarca de San Blas (Mandinga) east to the Colombian boundary, and beyond to Acandí in northernmost Chocó, Colombia.

*Remarks*.—The wing coverts are plain in most individuals of this race, with the white spotting typical of *M. e. cassini* and *M. e. maculifer* found only casually in a few. Specimens from the middle Chucunaque Valley, near the mouth of the Río Tuquesa, are intermediate between the new form and *cassini*, which ranges through the rest of the lowlands of the Tuira basin.

The name *niglarus* is taken from the Greek *νύλαρος*, a small fife, in allusion to the whistled calls of these birds, heard constantly as they move through the undergrowth on the forest floor.

#### IV. THE GEOGRAPHIC RACES OF THE SILVER-THROATED TANAGER, *TANGARA ICTEROCEPHALA* (BONAPARTE)

Specimens now available, particularly those from Costa Rica and the western half of Panamá, permit a better understanding of geographic variation in the tanager *Tangara icterocephala* (Bonaparte). The species, described from Ecuador in 1851, soon was recorded also from Costa Rica, and from Veraguas and Chiriquí in western Panamá. Cabanis, in 1861, named the Costa Rican bird *frantzii*, but Ridgway in 1902, with limited series, was not able to distinguish this as a separate race. Hellmayr, in 1936, and others have followed Ridgway's treatment, though with indication by some that there may be two forms. It is only recently that De Schauensee, in 1951, in his account of the birds of Colombia, recognized formally that there are two races. The uncertainty has resulted from the interesting fact that the populations of these birds in Ecuador and in Costa Rica both are bright in color, which obscures their differences. Specimens that I have collected in recent years from the mountains immediately west of the Canal Zone include another subspecies distinct from both of the others.

Females in all three races are duller, more greenish throughout, a

fact that should be borne in mind in comparing specimens in which the sex is not marked. Juvenile birds differ from adult females in more greenish back, hindneck, and crown, duller-colored rump, less definite streaking on the back, and duller yellow of the under surface.

**TANGARA ICTEROCEPHALA ICTEROCEPHALA** (Bonaparte)

*Calliste icterocephala* Bonaparte, Compt. Rend. Acad. Sci. Paris, vol. 31, No. 3 (séance du 20 janv.), 1851, p. 76. (Valley of Punta Playa, near Quito, Ecuador.)

*Characters.*—Similar to *T. i. frantzii* in bright coloration, but with feathers of crown and nape somewhat greenish basally, so that the yellow in this area appears less intense; partly concealed ring around the base of the hindneck deeper blue; foreneck and throat averaging faintly darker.

*Measurements.*—Males (12 specimens), wing 71.2-75.0 (72.7), tail 44.2-48.5 (45.8), culmen from base 12.1-12.5 (12.3), tarsus 16.0-17.3 (16.8) mm.

Females (9 specimens), wing 66.6-72.3 (68.7), tail 41.9-46.2 (43.4), culmen from base 12.2-14.2 (12.7), tarsus 16.2-17.5 (17.2) mm.

*Range.*—Mountains of eastern Darién, Panamá (Cerro Tacarcuna, Cerro Pirre) south in the western Andes through Colombia to southern Ecuador.

**TANGARA ICTEROCEPHALA ORESBIA** subsp. nov.

*Characters.*—Decidedly duller yellow throughout than either *T. i. frantzii* or *T. i. icterocephala*; partly concealed band on hindneck more greenish blue; foreneck and throat darker; sides and flanks darker, with a greenish-yellow cast: Female, in addition, with edging on back feathers more green, less yellow.

*Description.*—Type, U.S.N.M. No. 433998, male, south face of Cerro Campana, 850 meters elevation, western sector of the Province of Panamá, Panamá, collected March 7, 1951, by A. Wetmore and W. M. Perrygo (original number 16221). Lores, a very narrow line around eyelids, a small spot behind the eye, a narrow line posterior to the nostrils, and another from the gape across the lower margin of the cheeks to the nape, black; crown and sides of head slightly duller than light cadmium; nape washed with pyrite yellow; band across hindneck bluish gray-green; back feathers distinctly streaked, black centrally, edged broadly with sulphine yellow anteriorly, changing posteriorly to wax yellow; rump between light cadmium and apricot yellow; upper tail coverts oil green, tipped indistinctly with warbler green; wings and tail black; lesser and middle wing coverts edged with lettuce green, with a light tipping of lemon

chrome; greater wing coverts, primaries, and secondaries edged heavily with lettuce green; inner webs of central pair of rectrices cedar green; outer webs of all rectrices edged with lettuce green; point of chin black; feathers of throat, foreneck, and upper margin of chest dark green-blue gray, washed on throat and adjacent ramal area with dark bluish glaucous, on foreneck with light grape green, and on sides of neck with pinkish buff, with the darker basal color showing through in varying amount with change in angle of the light; center of breast and abdomen between light cadmium and lemon chrome; sides between light cadmium and aniline yellow; flanks and under tail coverts aniline yellow; tibia citrine; bend of wing warbler green, stippled lightly with black; under wing coverts light yellowish olive externally, changing to white internally, edged lightly with cream-buff. Bill black; tarsus and toes fuscous (from dried skin).

*Measurements*.—Males (8 specimens), wing 72.4-77.4 (73.6), tail 45.8-49.8 (47.3), culmen from base 12.0-14.8 (12.9), tarsus 17.5-18.8 (18.3) mm.

Females (9 specimens), wing 68.7-72.4 (71.1), tail 43.5-47.6 (45.6), culmen from base 12.5-14.0 (13.2, average of 8), tarsus 17.8-18.8 (18.3) mm.

*Range*.—Mountain areas of west central Panamá from Cerro Campana, western Provincia de Panamá, to Coclé (El Valle, Río Guabal).

The name of this form is taken from the Greek *ὄρεσβιος*, living on mountains.

#### TANGARA ICTEROCEPHALA FRANTZII (Cabanis)

*Callispiza (Chrysothraupis) Frantzii* Cabanis, Journ. für Orn., vol. 9, pt. 2, March 1861, p. 87. (Costa Rica.)

*Characters*.—Similar to *T. i. icterocephala*, but with crown and hindneck more yellow; partly concealed ring on base of hindneck paler, more greenish blue; foreneck and throat paler: definitely brighter yellow above and below than *oresbia*.

*Measurements*.—Males (14 specimens from Costa Rica), wing 72.3-78.6 (75.5), tail 44.7-49.8 (47.8), culmen from base 11.5-12.8 (12.3), tarsus 17.2-18.8 (18.0) mm.

Females (12 specimens from Costa Rica), wing 69.5-73.7 (71.7), tail 43.0-46.3 (44.9), culmen from base 11.5-12.6 (11.9), tarsus 17.2-18.5 (17.9) mm.

*Range*.—Mountains of Costa Rica and western Panamá, east to eastern Veraguas (Chitra).

V. ADDITIONS TO THE RECORDED LIST OF BIRDS FROM THE  
REPUBLIC OF PANAMÁSALMON'S TIGER-BITTERN, *Tigrisoma salmoni* SCLATER AND SALVIN :

This species, described from Medellín in the Province of Antioquia, northwestern Colombia, with a recorded range east to Venezuela and south through Ecuador and Perú to western Bolivia, ranges also along the Caribbean slope of the Isthmus of Panamá. It was first noticed for this area on February 29, 1952, when I collected an adult male on the Río Uracillo, near the town of that name in the foothills of the Caribbean slope of Coclé. I secured another, an immature bird, near the Peluca Hydrographic Station on the Río Boquerón, Province of Colón, on February 21, 1961, and have a third, shot on the Río Changena, Bocas del Toro, September 9, 1961. This species differs from the banded tiger-bittern *Tigrisoma lineatum* (Boddaert) structurally in the form of the bill, which is shorter and also heavier, less attenuate at the tip. The adult *salmoni* is definitely blacker, but the immature differs only in being more extensively white on the lower surface. With the presence of the species known I have found several immature birds in other collections taken earlier in Darién and the eastern Comarca de San Blas, but wrongly identified as *Tigrisoma lineatum*.

SLENDER-BILLED KITE, *Helicolestes hamatus* (TEMMINCK) :

The slender-billed kite is reported for Colombia on the basis of a record by Salmon from the Río Ité, near Remedios in Antioquia, and is known from scattered localities from eastern Perú to Venezuela (Caicara), Surinam, and the lower Amazon. In Darién, on February 24, 1959, as I landed from a piragua at the mouth of a tiny stream that enters the Río Tuira a short distance above where the Río Paya joins this larger river, I was interested to note shells of an apple snail scattered along the sandy shore, and immediately saw one of these kites perched over a shaded pool inside the forest border. The bird was a female. Later I received another skin from the Gorgas Memorial Laboratory, taken near the same point in the previous year. These are the first reports of this little-known species beyond South America.

GUÁCHARO, *Steatornis caripensis* HUMBOLDT :

On the night of March 19, 1959, Bernard Feinstein, assistant to Dr. Charles O. Handley, Jr., captured a female of this species in a mist net set for bats at an elevation of 975 meters near the old Tacarcuna village site on Cerro Tacarcuna, Darién. The guácharo

has a wide distribution in northern South America, including Trinidad, but has not been found previously outside those limits.

SHORT-TAILED SWIFT, *Chaetura brachyura brachyura* (JARDINE):

On September 12, 1960, Dr. Nathan Gale found one lying dead at Corozal, Canal Zone, and brought it to the laboratory of the Malaria Control Service. Here Eustorgio Méndez of the Gorgas Memorial Laboratory secured it and prepared the skin, which is now in the U. S. National Museum. The species has a wide range in South America from the north coast to eastern Perú and central Brazil, with populations in St. Vincent, Trinidad, and Tobago. The Canal Zone record is the first report of it for Panamá.

#### VI. ADDITIONS TO THE LIST OF BIRDS KNOWN FROM COLOMBIA

Studies of the extensive collections of birds from northern Colombia in the U. S. National Museum in connection with work on the avifauna of Panamá continues to add to the forms known from that republic. Recent additions in this field are as follows:

SAVANNA HAWK, *Heterospizias meridionalis rufulus* (VIEILLOT):

Examination of a considerable series of these beautiful hawks verifies recognition of two forms on the basis of size. The southern group that breeds from southern Paraguay and Rio Grande do Sul, Brazil, to the provinces of Córdoba and Santa Fé, in northern Argentina, ranges in wing measurement, regardless of sex, from 418 to 452 mm. During the period of southern winter part of these larger birds move northward into the territory of the typical race. The northern population, true *meridionalis*, resident from Panamá, Colombia, and Venezuela to Bolivia, northern Paraguay, and south-central Brazil, varies in wing measurement from 379 to 412 mm.

A female that I shot near Maicao in the Guajira Peninsula, northeastern Colombia, on April 14, 1941, with primaries worn at the tip, has the wing still 418 mm. long, and so represents a migrant or wanderer of the southern subspecies. Other breeding specimens taken during the same period in the Guajira in their smaller size are typical *meridionalis*.

GRAY HAWK, *Buteo nitidus blakei* HELLMAYR AND CONOVER:

A female collected by M. A. Carriker, Jr., at Acandí in northern Chocó, on the western side of the Gulf of Urabá, is typical of this race of adjacent Panamá. It differs from *Buteo nitidus nitidus*, found elsewhere in northern Colombia, in being darker gray above, particularly on the crown and hindneck. Apparently *blakei* does not



extend far into Colombia since De Schauensee has reported typical *nitidus* from the Río Juradó on the Pacific slope of northern Chocó, and Carriker secured that subspecies at Nazaret, in western Córdoba, beyond the Río Sinú.

PIGEON HAWK, *Falco columbarius bendirei* SWANN:

A male taken by Carriker February 26, 1946, at Manancanaca in the higher levels (3,600 meters) of the Sierra Nevada de Santa Marta is a well-marked adult of this migrant from western North America. The race *bendirei* has not been reported previously in South America. In this connection another specimen, a female that W. M. Perrygo and I secured April 15, 1946, at Jaque, Darién, only 40 kilometers from the Colombian boundary, is also of interest as the only record at present for Panamá.

BANDED WOOD-QUAIL, *Rhynchortyx cinctus cinctus* (SALVIN):

A series taken by Carriker at Socorro and Quebrada Salvajín, Córdoba, near the Río Sinú, at Tarazá, in northern Antioquia, near the Río Cauca, and at Volador in southern Bolívar, represents the typical race, hitherto unknown outside Panamá. *Rhynchortyx cinctus australis* Griscom, described from the Comarca de San Blas, on the Caribbean coast of eastern Panamá, with additional material proves not separable from typical *cinctus*, as the characters on which it was based are those of individual variation.

HOUSE WREN, *Troglodytes aedon inquietus* BAIRD:

Male and female taken January 5 and 7, 1950, by Carriker at Acandí, Chocó, on the western side of the broad entrance of the Gulf of Urabá, are good examples of this race, which is the form found throughout most of Panamá. The occurrence at Acandí is not surprising since this subspecies has been recorded east in the Comarca de San Blas to Puerto Obaldía near the Colombian frontier. Carriker secured another male *inquietus* February 9, 1950, at Necoclí, on the eastern shore of the Gulf of Urabá (called also Gulf of Darién), north of Turbo, and collected two house wrens April 28 in the same year farther south at Villa Artiaga in northwestern Antioquia that are intermediate toward *Troglodytes aedon striolatus*, but nearer to *inquietus*. It appears, therefore, that the form typical of most of Panamá extends around the head of the Gulf.

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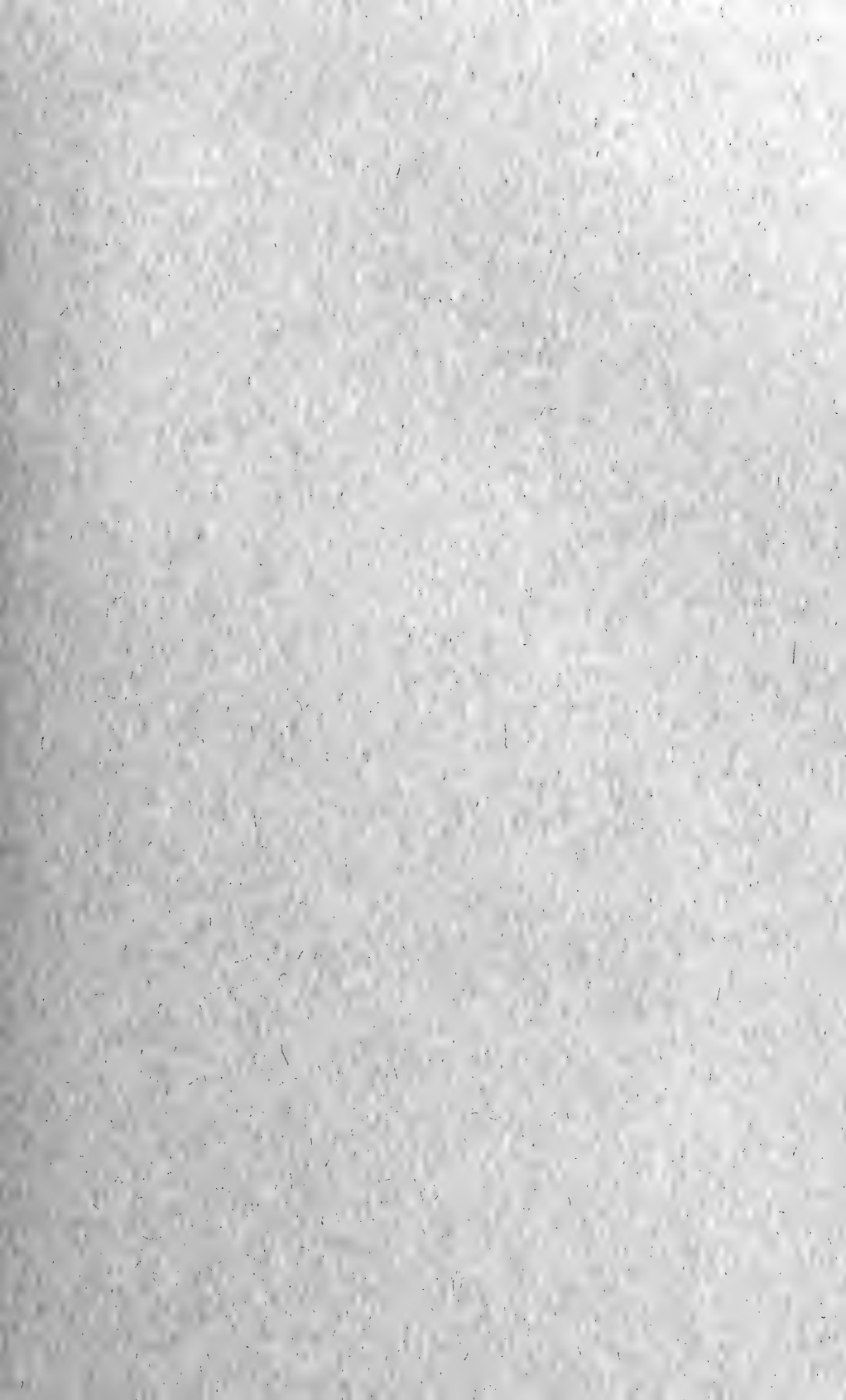
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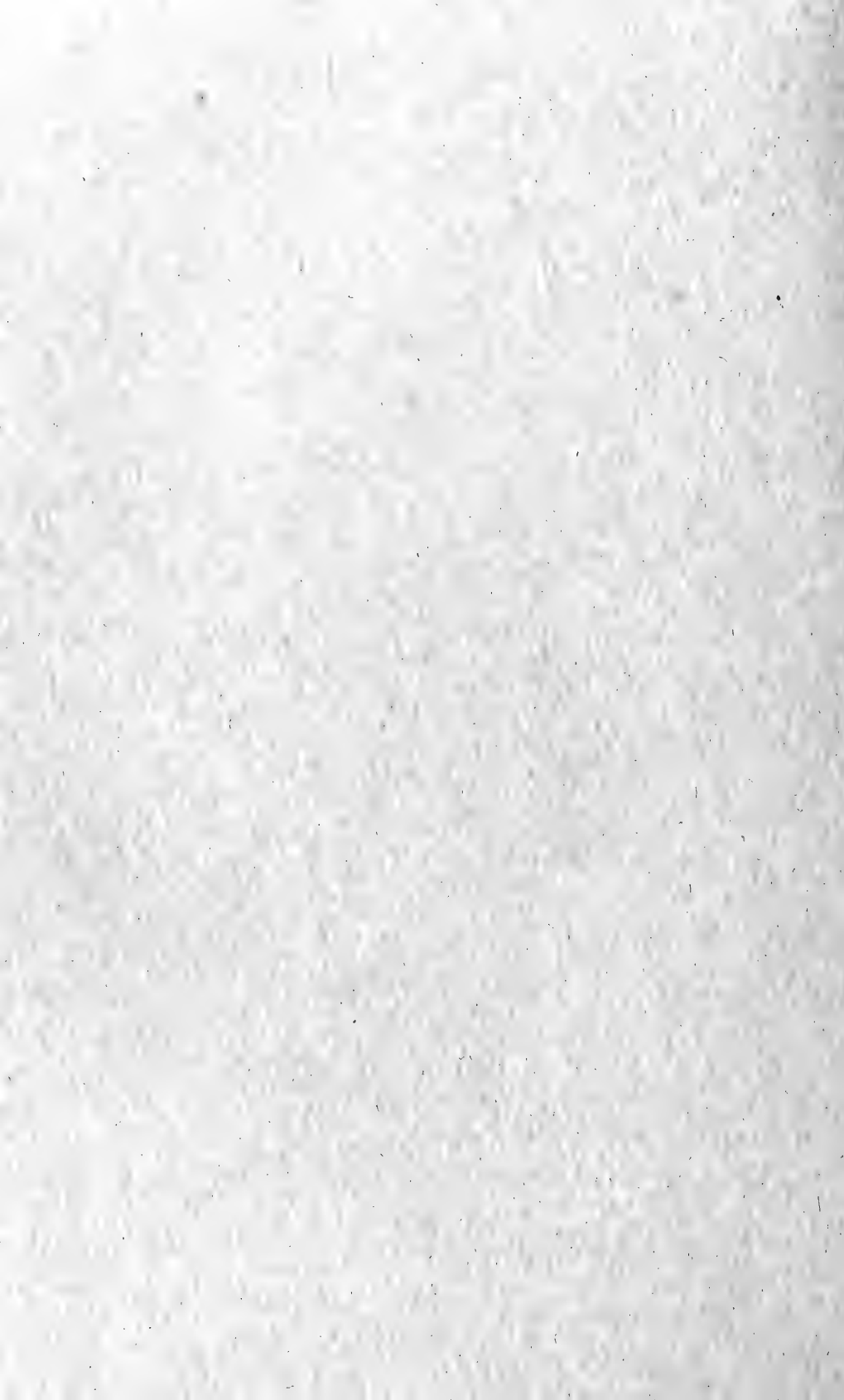
NOTES ON FOSSIL AND SUBFOSSIL  
BIRDS

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NOTES ON FOSSIL AND SUBFOSSIL BIRDS

By ALEXANDER WETMORE

*Research Associate  
Smithsonian Institution*

The following pages cover several studies on fossil and subfossil birds, based mainly on material in the U.S. National Museum. The collection from the Pleistocene of Augusta County, Va., has come through the kindness of John E. Guilday of the Carnegie Museum. The bones from Bermuda were collected for the Smithsonian Institution by David B. Wingate.

I. AN UPPER CRETACEOUS BIRD RELATED TO THE IBISES

In the summer of 1958, Dr. Shelton P. Applegate, now at State College, Arkansas, collected a broken humerus of a bird in Greene County, west-central Alabama, that appears related to the storks and ibises of the order Ciconiiformes. According to data supplied by Dr. Applegate, the specimen came from Hewletts farm, 3 miles northeast of the town of Boligee, where it was found in the farther side of a series of gullies that lie to the west of the county road, before this reaches the farmhouse entrance. The location, in the Mooreville formation of the Selma chalk, was about 10 feet below the Arcola limestone.

The form of the humerus indicates a species about half the size of the living white ibis *Eudocimus albus*.

**PLEGADORNIS** gen. nov.

*Diagnosis.*—A fossil storklike bird, with the distal end of the humerus flattened, ectepicondyle long, and the brachial depression shallow and relatively large. Characters in detail those of the only known species, *Plegadornis antecessor*, the type of the genus.

**PLEGADORNIS ANTECESSOR** sp. nov.

*Characters.*—Known from a fragmentary left humerus that is generally similar to living species of the suborder Ciconiae; much smaller than the smallest of living forms of the suborder (half the

size of *Plegadis*, or less). Outline of distal end of the humerus (fig. 1) somewhat similar to that of species of the family Threskiorn-

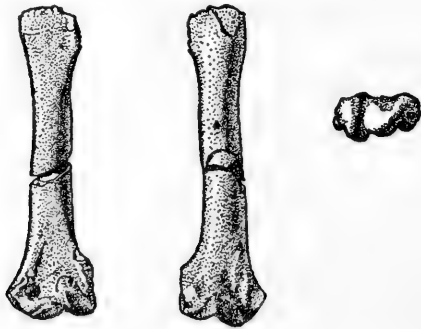


FIG. 1.—Type of *Plegadornis antecessor* from the Upper Cretaceous of Alabama. Natural size.

nithidae, but with the ectepicondyle elevated above the level of the internal condyle at a slightly greater angle; attachment of anterior articular ligament relatively much larger; internal condyle relatively longer and slightly narrower; external condyle slightly less angular on upper end, with more separation from the ectepicondyle on its outer margin; the ectepicondyle much larger, so that one-fourth of its length extends up the shaft above the level of the upper end of the external condyle; brachial depression large and only slightly depressed; a slight expansion from the side of the shaft at the lower end of the deltoid crest, below the actual articular area, like that in modern species of Threskiornithidae, particularly of the subfamily Plataleinae.

Transverse breadth across distal end 10.5 mm.; transverse breadth of shaft near center 4.9 mm.

*Type*.—Distal end of left humerus, with part of the shaft from the upper end, U.S.N.M. No. 22820, from the Mooreville formation of the Selma chalk, Upper Cretaceous, 3 miles northeast of Boligee, Greene County, Ala., collected by Shelton P. Applegate about June 20, 1958.

*Remarks*.—The important part of the specimen is the distal end, which is somewhat worn, but where sufficient character is present to allow indication of relationship. The upper segment shows a trace of the curvature characteristic of the suborder in which it is allocated, and an indication of the form at the extreme lower end of the deltoid crest, but has lost other details. A section of the shaft between the upper and lower portions is missing.

The fossil is important because of its indication, slight though that may be, of the occurrence of ibislike birds at this early period, and in its general similarity to species of this group that still exist. It is the first fossil bird recorded from Alabama.

While it appears allied to species now classified in the suborder Ciconiae, which includes the families of the hammerhead (*Scopus*), the storks (family Ciconiidae), and the ibises (Threskiornithidae), its differences, as indicated in the diagnosis, are such that it requires a separate family, Pelagodornithidae, to be allocated in a superfamily Pelagodornithoidea, adjacent to the superfamily Threskiornithoidea.

The generic name for this interesting species is formed from the Greek root for *Plegadis*, a widely distributed modern genus of ibises, viz, πλεγγάς, *ados*, and ὄρνις, bird. The specific name, the Latin word "antecessor," signifies a forerunner (or ancestor).

## II. A RECORD OF THE COMMON LOON, *GAVIA IMMER* (BRÜNNICH), FROM THE PLEISTOCENE OF MARYLAND

The cranium of a loon found in December 1959 on the shore between Chesapeake Beach and Plum Point, on Chesapeake Bay, in Calvert County, Md., has been presented to the U.S. National Museum by Miss Alice H. Howe of Arlington, Va. The specimen (U.S.N.M. No. 22552) is stained dark brown in color and still retains a film of fine clay silt in the deeper impressions. Its appearance, both in color and in the clay deposit, is indication of ancient age and is typical of the Pleistocene deposits that lie above the Miocene beds in the earthen cliffs that line this section of Chesapeake Bay. There is no reason therefore against listing the bone as of that age.

The bone (fig. 2) includes the upper surface of the cranium from the base of the premaxilla to the foramen magnum, except that the ridge immediately above the foramen is missing, and there are minor breaks in the posterior area of the frontal. Below, the basioccipital area has been lost.

The bone obviously is representative of an adult of a large species of the genus *Gavia*. On comparison of 10 skulls of *Gavia immer* with 6 of *G. adamsii*, all of adult age, I find that the cranial section in the former averages less massive in form. The angle of the anterior end of the frontals, immediately posterior to their junction with the nasals, in most is less abrupt, and the transverse width through the heavy postorbital processes is less. In *G. adamsii* the cranium is more massive, the anterior end of the frontals slopes more abruptly, and

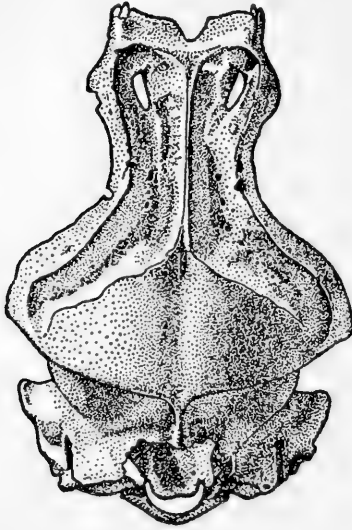


FIG. 2.—Dorsal view of the cranium of a common loon, *Gavia immer*, from the Pleistocene of Maryland. Natural size.

the transverse width indicated is greater. While the largest skulls of *immer* are close to *adamsii* the smaller ones appear distinct. The specimen under identification agrees with the medium-sized and smaller samples of *immer* and is identified as that species.

The occurrence on Chesapeake Bay is an additional Pleistocene record for *Gavia immer*, which has been reported previously from deposits of that age in California and Florida.

### III. THE WHOOPING CRANE, *GRUS AMERICANA*, IN MICHIGAN

In a recent visit to the Chicago Natural History Museum I noted a Pleistocene bone identified tentatively as this species, which Dr. Rainer Zangerl has kindly placed in my hands for study. The specimen is a left tarsometatarsus of a juvenile individual which apparently had developed the full length of this segment of the bone, but in which the upper end was not fully ossified, as the surface of the articulation is not completely formed. The shaft also is slender with its outlines rounded, less angular than in adult specimens, and the entire bone presents the slightly roughened spongy appearance that marks an immature stage. The distal trochlea and the talon both are broken and missing, but it is possible to ascertain the length from the anterior end to the distal foramen, which equals that of modern adult tarsometatarsi in the U.S. National Museum Collections. It is

identified, without question, as *Grus americana* (Linnaeus), the whooping crane.

The specimen, Chicago Natural History Museum No. P25538, found one-half mile northwest of Ferry, Oceana County, Mich., in what was reported to be a Pleistocene marl, was presented to the Museum by George W. Bowen. The record is of particular interest since it is not only a new fossil locality for this species, but also is the first report of this crane from the State of Michigan.

The species has been recorded previously as a fossil from the Upper Pliocene of Idaho, and from the Pleistocene of California and Florida.

#### IV. BIRDS OF LATE PLEISTOCENE AGE FROM AUGUSTA COUNTY, VIRGINIA

Through the kindness of John E. Guilday of the Carnegie Museum a collection of bird bones from small caves and fissures at the bases of the rock columns known as the Natural Chimneys, a mile north of Mount Solon, Va., has come to me for study. According to data supplied by Mr. Guilday, the presence of bones at this site was reported first in 1949 by Theodore B. Ruhoff, who has collected the bulk of the material. Parties from the Carnegie Museum, directed by J. LeRoy Kay, curator emeritus of the section of vertebrate paleontology, also participated, until 1961. The work was possible through the kind permission and assistance of Mr. and Mrs. Gordon E. Brown, owners of the property.

The bird remains were associated with abundant bones of mammals and a smaller representation of reptiles and amphibians. Most of the specimens are of such size and condition as to indicate the probability that the deposit was accumulated through pellets regurgitated by ancient owls. It must be stated, however, that no bones of owls are included. The casual intrusion of fragments of larger birds is assumed to have come through predators that sheltered in the caves, or through the activities of wood rats, abundantly represented among the small mammals.

A complete report on the site prepared by Mr. Guilday (in press) will contain a list of all the vertebrates, a detailed account of the mammals, and a discussion of the entire fauna and its significance. In the present account it is sufficient to state that the mammalian remains include a number of boreal forms foreign to the area in historic times, as well as four extinct species of the Pleistocene. These indicate the probable age as near the end of Wisconsin time. The birds support this assignment, as among them the spruce grouse and

the gray jay today are inhabitants of northern coniferous forests, and the sharp-tailed grouse and the magpie also are northern and northwestern in modern distribution. None of the birds may be regarded as typically southern since all the others identified are species that, while found today as residents or migrants in Virginia, range widely to the north. The presence of all at the end of the Pleistocene in what Mr. Guilday has named the Natural Chimneys local fauna is definitely of outstanding interest since this is the first extensive avian fossil deposit reported for the State. The list includes 38 species, with 2 others identified to genus. Fragmentary bits that could not be named include several additional small passeriform species.

The bird bones are pale ivory to nearly white in color, except for a few that are gray or blackish gray, due apparently to staining, as none are mineralized. All are well preserved, only occasional ones being friable or brittle. A few come from juvenile individuals, some of them probably from young grouse, though this is not certain.

#### ANNOTATED LIST OF SPECIES

##### Family ANATIDAE: Ducks

*Anas discors* Linnaeus: Blue-winged Teal.

At least two individuals: Central section of right ramus of a mandible, from the anterior end of the surangular forward to include somewhat more than half of the dentary; proximal ends of two right humeri; left tarsometatarsus with the head missing.

Difference in size in the fragmentary wing bones indicates that male and female birds may be represented. The part from the lower leg is one with maximum development of the sculptured lines marking the location of tendons and their attachment found in individuals more than a year old.

This teal is recorded from several Pleistocene localities in Florida.

*Bucephala albeola* (Linnaeus): Bufflehead.

One individual: A left carpometacarpus, with the shaft of metacarpal III missing. This agrees in the details of length of the distal symphysis, angle of anterior slope of metacarpal I, form of the facet for articulation of the pollex, and angular compression of the inner margin of the shaft of metacarpal III, with modern specimens.

The several Pleistocene records for the bufflehead include reports from Oregon, California, and Florida.

*Oxyura jamaicensis* (Gmelin): Ruddy Duck.

One individual: Proximal two-thirds of a left humerus. The small

size indicates that the bird, which appears to have been adult, was a female.

The ruddy duck has been identified in Pleistocene deposits in Oregon, California, and Florida.

#### Family ACCIPITRIDAE: Hawks

*Accipiter striatus* Vieillot: Sharp-shinned Hawk.

One individual: A right carpometacarpus, complete, is from a bird of small size that agrees in dimension with males.

The sharp-shinned hawk has been identified from the Pleistocene of California and Florida, and from pre-Columbian cave deposits of ancient but uncertain age on Great Exuma in the Bahama Islands.

*Buteo jamaicensis* (Gmelin): Red-tailed Hawk.

One individual: A left femur, with broken shaft and some wear on the proximal end.

The red-tail, widely distributed in modern time from northern Canada to western Panamá, has been found in several Pleistocene localities in California and Florida.

*Buteo lineatus* (Gmelin): Red-shouldered Hawk.

One: Distal end of a right humerus, small in size.

The red-shouldered hawk, found in eastern North America from Minnesota and southern Quebec to central México and Florida, and west of the Rocky Mountains in California and Baja California, is known from Pleistocene time in Florida and California.

*Buteo platypterus* (Vieillot): Broad-winged Hawk.

One individual: Distal third of a right tarsometatarsus, with the trochlea intact. The specimen has the size of male birds.

Broad-wings nest in eastern North America from southern Canada to Texas and Florida, and in the West Indies. There is one report of the species from the Pleistocene of Florida.

#### Family TETRAONIDAE: Grouse

*Canachites canadensis* (Linnaeus): Spruce Grouse.

One individual, possibly more: Distal third of left humerus; distal two-thirds of left ulna; right tarsometatarsus complete. The humerus in this species in length is similar to that of the ruffed grouse, but the shaft is more slender, the internal condyle and the ectepicondyle are slightly smaller, and the impression for the brachialis anticus is less clearly outlined. The ulna is more slender, with the external condyle smaller. The slightly shorter tarsometatarsus has the trochleae some-

what narrower, with the outer one swung more toward the center line, so that support for the toes is narrower. Also the facet for the articulation of the hind toe is of lesser size, and on the anterior face the excavation below the head is smaller, with the tubercle for the tibialis anticus shorter and less prominent.

This species definitely represents a boreal element in the fauna, as in its modern distribution it is widely spread through the Canadian zone forests from Alaska across Canada, south in the eastern half of the United States only to northern Wisconsin, northern New York, northern Vermont, northern New Hampshire, and Maine. The present record is the first report south of these limits, as well as the first from ancient time.

*Bonasa umbellus* (Linnaeus): Ruffed Grouse.

Three or more individuals: Two premaxillae; proximal end of two left humeri, and shaft and distal end of another; a left ulna; one left coracoid, and the proximal end of another; one right carpometacarpus, and two others nearly complete; distal half of a left tarsometatarsus. The carpometacarpus is heavier than that of *Canachites canadensis*, especially in the shaft of metacarpal III, and the intermetacarpal tuberosity is larger.

The ruffed grouse, common today in western Virginia, is known from deposits of Pleistocene age in California, Tennessee, Maryland, Pennsylvania, and Florida.

*Pedioecetes phasianellus* (Linnaeus): Sharp-tailed Grouse.

Four or more individuals: One partial premaxilla; a fragment from the anterior end of a sternum; one right coracoid, somewhat worn, head of another from the left side; heads of three left and one right humeri, with distal ends of two from the left side, and one from the right; one right carpometacarpus with the shaft of metacarpal III missing; and a fragment of the distal end of a right tarsometatarsus. The head of the left humerus is distinctly larger than any of the three from the right-hand side, so that it is certain that it came from a fourth individual.

In modern time the sharp-tailed grouse has been a species of the north and west, with a range that extends from north-central Alaska across to central Quebec, south to eastern Oregon, in the mountains to northern New Mexico, and east to Nebraska, Minnesota, and northern Michigan. Formerly it ranged a little farther south to northeastern California, western Kansas, and northern Illinois, areas from which it has disappeared with agricultural use of the land, and increase in hunting. The only previous report of the species east of this modern



range is from bones of late Wisconsin age found by John E. Guilday and his associates in Lloyd's Rock Sinkhole in the New Paris Sinkholes of Bedford County, western Pennsylvania. The present record, about 120 miles to the south, is indication of a former range in the late Pleistocene, and the period immediately following, through the valleys of the northern Appalachian region.

The bird is known also from deposits of Pleistocene age at Fossil Lake, Ore.

#### Family PHASIANIDAE: Pheasants, Quails

*Colinus virginianus* (Linnaeus): Bobwhite.

One individual: Head of a left humerus; a right femur, nearly complete.

The bobwhite, of wide range in eastern North America, has been found in the Pleistocene in Tennessee, and at several localities in Florida.

#### Family MELEAGRIDIDAE: Turkeys

*Meleagris gallopavo* Linnaeus: Turkey.

Two individuals: The shaft of a left coracoid; the broken distal end of a left tarsometatarsus. The two differ so definitely in size that it is evident they are from separate birds.

Turkey bones have been recorded widely from Pleistocene time in New Mexico, Illinois, Indiana, Tennessee, Arkansas, and Florida.

#### Family GRUIDAE: Cranes

*Grus americana* (Linnaeus): Whooping Crane.

One: Shaft and proximal end of a left coracoid. The bone is fragmentary, with indications of the tooth marks of rodents, but enough remains to indicate clearly that it is a crane, while the large size identifies it as from the whooping crane.

This species, now much reduced in numbers, was reported in eastern United States in the early days of European settlement from New York, New Jersey, and South Carolina. The present record is the first from ancient time north of Florida, where bones have been found in Pleistocene deposits at three localities. It is also the only report of this bird within the boundaries of present-day Virginia.

#### Family CHARADRIIDAE: Plovers

*Charadrius vociferus* Linnaeus: Killdeer.

One: Distal end of a right humerus.

The killdeer has been recorded from the Illinoian stage of the Pleistocene in Florida.

Family SCOLOPACIDAE: Snipe, Sandpipers

*Philohela minor* (Gmelin): American Woodcock.

One individual, possibly two: Proximal half of a left humerus; a complete left tarsometatarsus. The leg bone appears to be from a slightly smaller individual than the humerus.

The woodcock, found locally throughout Virginia, is reported from a Pleistocene cave deposit in Florida.

*Bartramia longicauda* (Bechstein): Upland Plover.

One: Right and left coracoids. These are identical in size and color and may be from the same individual.

The upland plover, formerly common in Virginia, is now much reduced in number. It has been found in late Pleistocene deposits in Kansas.

*Catoptrophorus semipalmatus* (Gmelin): Willet.

One: Distal half of a right tarsometatarsus. The modern skeletons at hand include a pair each of the two geographic races currently recognized in this species. The humeri in these show the same differences in size that separate the birds in the flesh, or when preserved as museum skins, the females in each being larger than the males. It is significant to record that the humerus in the female of the subspecies *Catoptrophorus semipalmatus semipalmatus* is appreciably smaller than that of the male *C. s. inornatus*. The bone from Natural Chimneys has the size of male *inornatus* and is identified as that race. In modern times this subspecies nests through the western part of our continent, but is common in migration and winter along the eastern seaboard.

The only previous ancient record for the willet is from Pleistocene deposits on the Newport Bay Mesa near the coast of southern California.

*Erolia minutilla* (Vieillot): Least Sandpiper.

One: A complete right humerus, typical of this bird.

This is the first ancient report for the species, which now nests in the north and spreads widely in migration, as far as Perú and central Brazil.

Family COLUMBIDAE: Pigeons, Doves

*Ectopistes migratorius* (Linnaeus): Passenger Pigeon.

More than 21 individuals: 11 fragments of right humeri, and

2 entire and 8 fragments of the left side; 1 entire and 3 fragmentary ulnae from the right side, with 1 entire and 3 fragments from the left side; 1 entire and 6 broken right carpometacarpi, with 4 fragments from the left side; anterior ends of 11 sterna; 5 entire, 16 or more fragmentary right coracoids, and 4 entire and 10 fragments from the left side; anterior ends of 3 right and of 6 left scapulae; distal end of 1 right and of 2 left tibiotarsi; 1 entire and 3 partial right tarsometatarsi, and parts of 4 from the left side.

From the abundance of these remains the passenger pigeon must have been common and easily taken, probably from a roost, if the deposit of bones is accepted as an accumulation from cast pellets of night-feeding owls. All the bones are from fully adult birds which points to a gathering outside the nesting season. This species, now long extinct, was abundant during the period of settlement in Virginia, with extensive roosts recorded as late as 1872. It was last reported in the State definitely in 1890, uncertainly in 1892.

Passenger pigeon bones have been found frequently in Indian village sites of pre-Columbian age, and are recorded from the Pleistocene in California, Tennessee, and Florida.

#### Family ALCEDINIDAE: Kingfishers

*Megaceryle alcyon* (Linnaeus): Belted Kingfisher.

One: Proximal half of a left humerus.

There is one report of this kingfisher from the Pleistocene of Florida.

#### Family PICIDAE: Woodpeckers

*Colaptes auratus* (Linnaeus): Yellow-shafted Flicker.

One: Distal half of a right tarsometatarsus.

The occurrence at Natural Chimneys is listed under the name of the eastern species of the genus, following the modern geographical ranges of these woodpeckers. But it should be noted that in available skeletons there appear no trenchant characters on which the three species of *Colaptes* of the A.O.U. Check-list may be separated.

In the eastern region of North America flickers have been reported from three localities in the Pleistocene of Florida.

*Centurus carolinus* (Linnaeus): Red-bellied Woodpecker.

One: A left tarsometatarsus, complete.

The species is recorded from the Pleistocene of Florida.

*Melanerpes erythrocephalus* (Linnaeus): Red-headed Woodpecker.

Two individuals: A right humerus, complete, and another from the

left side without the head; a right tarsometatarsus, complete. The humeri are not a pair as they differ slightly in size.

There is one Pleistocene record for this species from Florida.

*Dendrocopos pubescens* (Linnaeus): Downy Woodpecker.

One: A right humerus with the distal end missing.

This is the first ancient record for this species.

#### Family TYRANNIDAE: Tyrant Flycatchers

*Sayornis phoebe* (Latham): Eastern Phoebe.

Three individuals: Two right humeri, and another from the left side, all complete. Slight differences in size indicate that each bone comes from a separate individual. The occurrence of this species is one that would be expected from its habit of placing its nest on sheltered projections on rock faces.

The record is the first one for this bird in ancient time.

*Contopus virens* (Linnaeus): Eastern Wood Pewee.

One: A complete left humerus. This agrees with the wood pewees, and is listed as above on geographic grounds.

It is the first report of this group in prehistoric time.

#### Family HIRUNDINIDAE: Swallows

*Petrochelidon pyrrhonota* (Vieillot): Cliff Swallow.

Eight or more individuals: A series of humeri that includes two complete and two fragments from the right side, and four complete and three additional segments from the left.

The humerus in this species is approached in size among our smaller swallows by the tree swallow, but has the head slightly larger and the shaft heavier. The other species concerned are all distinctly smaller.

The relative abundance of bones of this species compared to those of other of the small birds indicates a nesting colony, a supposition that appears to be verified by one bone with the porous structure of the head typical of immature individuals not fully grown.

Cliff swallow bones are reported from the Pleistocene of California.

#### Family CORVIDAE: Jays, Magpies, Crows

*Perisoreus canadensis* (Linnaeus): Gray Jay.

One: A right tarsometatarsus with the trochlea for the fourth digit missing, but otherwise complete. More slender form, greater outward slant of the external face of the talon, relatively smaller

trochleae, and more widely open groove on the anterior face of the head between the external and internal cotylae, identify this bone in the gray jays from species of similar size of the genera *Cyanocitta* and *Aphelocoma*.

This is another bird that is found in modern times in the coniferous forests of the north and northwest, with extension southward only along the higher mountains of the west. In much of this area it ranges in the same regions as the spruce grouse, also its companion in ancient Virginia.

The present record is the first report of the gray jay in the prehistoric period.

*Cyanocitta cristata* (Linnaeus): Blue Jay.

One: A complete left humerus.

The widely ranging eastern blue jay is reported from the Pleistocene of Florida.

*Pica pica* (Linnaeus): Black-billed Magpie.

One: Proximal half of a left humerus.

This record is one of particular interest since, though the magpie in the Old World is spread from western Europe across northern Siberia, in North America it has been restricted to the western half of the continent. The find in Virginia indicates an early distribution to the eastward, with subsequent withdrawal westward, a circumstance without apparent explanation. Many magpie bones have been found in caves and other ancient deposits throughout Europe, but the present find is the first report from America, since Dr. Brodkorb informs me that a record for it from the lower Pleistocene of Randall County, Tex., refers to another species.

#### Family SITTIDAE: Nuthatches

*Sitta canadensis* Linnaeus: Red-breasted Nuthatch.

One: A left humerus, complete.

This nuthatch is present in Virginia now as a breeding species wherever spruce forest remains on the higher mountains, and as a winter visitor from the north.

It is recorded from deposits of late Pleistocene age in California.

#### Family MIMIDAE: Mockingbirds, Thrashers

*Toxostoma rufum* (Linnaeus): Brown Thrasher.

One: A complete right humerus.

This is the first report of this bird in the prehistoric period.

## Family TURDIDAE: Thrushes, Bluebirds

*Turdus migratorius* Linnaeus: Robin.

One or more: A premaxilla; a complete right humerus, and one from the left side with the head missing. The wing bones are of maximum size for this species.

The only other ancient record for the robin is from the late Pleistocene of California.

*Hylocichla* sp.: Thrush.

One: A left humerus complete. This comes from one of the smaller species of this group. It is not the wood thrush, which is larger, but except for this, it is not practicable to indicate relationship, since the related species may not be separated from one another on the basis of this single bone.

## Family ICTERIDAE: Meadowlarks, Blackbirds, Orioles

*Agelaius phoeniceus* (Linnaeus): Red-winged Blackbird.

Two individuals: Right and left humeri with the heads broken. These differ in size so that they come from two individuals.

The species is known from the Pleistocene of Ontario and Florida.

*Molothrus ater* (Boddaert): Brown-headed Cowbird.

One or more: Right and left humeri of such similar size that they may be a pair.

This is the first ancient record for the species.

## Family FRINGILLIDAE: Grosbeaks, Finches, Sparrows, Buntings

*Junco* sp.: Junco.

One: A complete right humerus.

While this agrees with the slate-colored junco it is not practicable to make a specific identification among the several species of similar size in this genus.

*Zonotrichia albicollis* (Gmelin): White-throated Sparrow.

One: A complete left humerus.

This is the first ancient record for this species.

*Passerella iliaca* (Merrem): Fox Sparrow.

One: The symphysis of a lower mandible. This agrees in full detail with modern skeletons. The form of the thickened inner margin of the anterior end of the dentary, smooth and rounded when viewed from above, and shelflike when seen from below, is characteristic of this species. The bone is similar to that of the small-billed eastern subspecies.

Fox sparrows have been recorded from two Pleistocene localities in California.

*Melospiza melodia* (Wilson): Song Sparrow.

One: A right humerus.

The widely ranging song sparrow is reported from the Pleistocene of California.

#### V. BONES OF BIRDS FROM COCKROACH ISLAND, BERMUDA

In November 1958, David B. Wingate forwarded a considerable collection of bones from Bermuda, collected on Cockroach Island, located in Harrington Sound off the base of Abbott's Cliff. Most of these specimens were dug from about 4 cubic feet of sandy soil and rubble, some of them from near the surface where they were among roots of plants. Many are of young birds, ranging from nearly adult to half or even one-third grown indicating a breeding colony. In careful digging no associated skeletons were encountered, so that the site was one where separate bones had accumulated.

While the age of these specimens is unknown, the material probably is Recent, though, with one exception from the pre-Columbian period. The few remains of the white-tailed tropicbird obviously are of modern age. The uniform pale brownish-white cast in all the other material indicates a deposit of some antiquity, though whether this is of hundreds of years or of a longer period remains uncertain. A few molluscan shells that accompanied the bones have been identified by Dr. J. P. E. Morrison of the National Museum as *Pocillozonites bermudensis* Pfeiffer, a living species that in time ranges back to deposits of Pleistocene age.

There have been several reports of bones of birds from caves in the Bermudas but usually without identification, the earliest account that I have seen being that of Nelson (1840, p. 113). In view of the small amount of definite information on such deposits in Bermuda, I have prepared the brief account of the collection made by Mr. Wingate which follows.

Family PROCELLARIIDAE: Shearwaters, Fulmars

**PUFFINUS LHERMINIERI** Lesson: Audubon's Shearwater

*Puffinus* [sic] *lherminieri* Lesson, Rev. Zool., vol. 2, No. 3, April (May), 1839, p. 102. (Guadeloupe, Lesser Antilles.)

*Puffinus parvus* Shufeldt, Ibis, ser. 10, vol. 4, No. 2, Oct. 2, 1961, p. 632. (Recent deposits in the bone caves of Bermuda.)

The few bones of this species include humeri, radii, ulnae, meta-

carpals, coracoids, a femur, tibiotarsus, tarsometatarsi, a sternum, and parts of a skull, that probably represent half a dozen individuals. While the wing and leg bones may be sorted in two groups one of which is slightly smaller than the other, it is seen on close scrutiny that the specimens of lesser size all are obviously immature, some of them quite young. It is my opinion therefore that the smaller size in these is due to their not having attained full growth.

Shufeldt (1916, p. 632) in study of a collection of cave bones from Bermuda noted two apparent size groups and named the smaller one *Puffinus parvus*. While I have not had opportunity as yet to examine his material, the plates that he published in a later account (Shufeldt, 1922) do not appear to substantiate his claims, particularly since at the time he had available only one skeleton of *Puffinus lherminieri* in the U. S. National Museum for comparison. This individual is near the maximum size for the species. His smaller specimens as illustrated show no differences in size from the range of variation found in the series now available, particularly when it is understood that all Shufeldt's illustrations are not natural size, though so indicated in the legends. I regard *parvus*, therefore, as a synonym of *lherminieri*.

*Puffinus mcgalli* Shufeldt (1916, p. 630; 1922, p. 354), based on a nearly complete sternum, appears to be an example of *Puffinus puffinus*, as the figures agree exactly with a sternum of a female *Puffinus puffinus puffinus*, No. 227465 in the U. S. National Museum collections.

**PTERODROMA CAHOW (Nichols and Mowbray): Bermuda Petrel**

*Acstrelata cahow* Nichols and Mowbray, Auk, vol. 33, No. 2, April (March 31), 1916, p. 194. (Southeast side of Castle Island, Bermuda.)

*Acstrelata vociferans* Shufeldt, Ibis, ser. 10, vol. 4, No. 4, Oct. 2, 1916, p. 633. (Bermuda.)

The greater part of the bones in the present collection are those of this species, including abundant representation of wing and leg bones, parts of 12 skulls, 12 sterna, 23 furculae, several coracoids, scapulae and parts of more than 14 pelves. The indication is that more than 25 individual birds are represented. About one-half come from young birds that range from one-third grown to full size, but the latter with the ends of some of the long bones still spongy. The indication is clear that the site where the bones were found was a breeding colony of this petrel, formerly abundant in Bermuda.

The adult bones all agree in detail with the modern skeletons of the cahow in the U. S. National Museum.



## Family PHAËTHONTIDAE: Tropicbirds

## PHAËTHON LEPTURUS Daudin: White-tailed Tropicbird

*Phaëton lepturus* Daudin, in Buffon, Hist. Nat., ed. Didot, Quadrupèdes, vol. 14, 1802, p. 319. (Mauritius.)

The right and left ulna, right and left radius, carpometacarpus, and scapula that represent this species are obviously modern in appearance, and are believed to represent an intrusion in the older deposit. It is probable that all come from one individual as the duplicate elements are paired.

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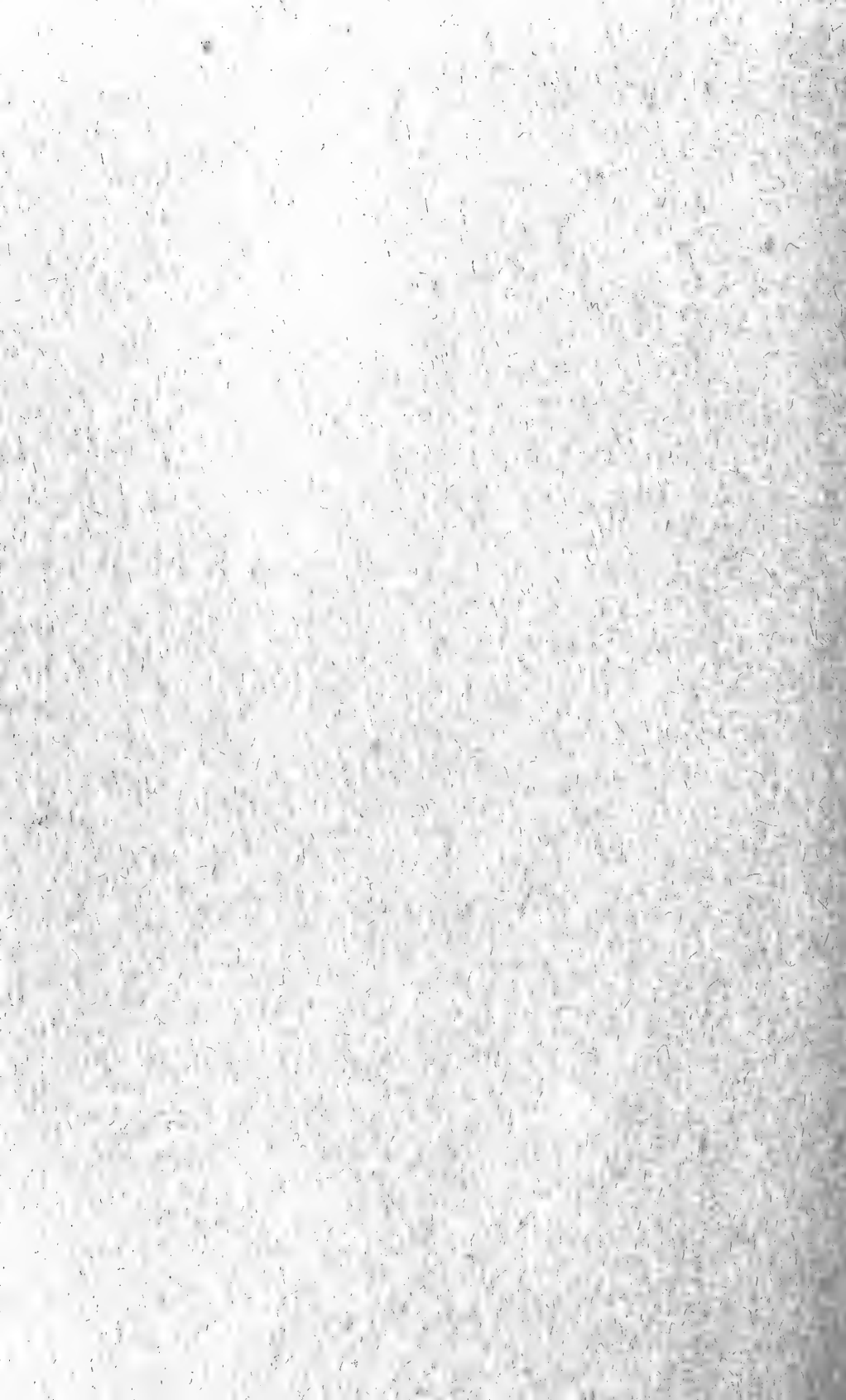
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THE LIGHT OF RECENT PUBLICATIONS

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HERBERT FRIEDMANN  
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# THE PROBLEM OF THE VIDUINAE IN THE LIGHT OF RECENT PUBLICATIONS

BY HERBERT FRIEDMANN

*Director, Los Angeles County Museum*

While my study of the parasitic weaverbirds (1960) was in press, an important paper by Steiner (1960) appeared. Although his attention was centered largely upon the waxbills and their allies (the spemestids of his paper; estrildids of mine), he briefly discussed the systematic position of the Viduinae and their relationships with the waxbills and came to conclusions different from my own. Inasmuch as Steiner's experience and thinking concerning the waxbills were both prolonged and extensive, it is necessary to consider his comments carefully and objectively, even though I am still of the opinion that to accept them poses more difficulties than it solves.

The various recommendations made by Steiner and others prior to 1959 were reviewed in my account (1960, pp. 3-9), where a consideration of their not altogether harmonious contents led me to conclude that it was more nearly correct and acceptable to keep the waxbills and their allies in the Ploceidae than to erect a separate family for them. It was recognized that there were substantial arguments for recognizing a separate family for the estrildines, but there were equally suggestive ones for keeping them as a subfamily of the Ploceidae. One could not lightly overlook the conclusion that they constitute a distinct family arrived at by two of their most careful investigators, Steiner and Nicolai, under conditions of aviculture. On the other hand, Chapin's very extensive field acquaintance with many of the included genera and species and his interest in the classification of the whole assemblage caused him to consider them as one family. In his last extensive treatment of a good portion of the whole weaverbird complex, Chapin (1954, pp. 286-287) has this to say:

The three most highly specialized subfamilies are believed to be the Passerinae, Ploceinae, and Estrildinae. The most primitive group of all is the Bupalornithinae, which at one time I believed should be treated as a distinct family. In 1925 Peter Sushkin convinced me that the Plocepasserinae are distinctly intermediate between the buffalo-weavers and the sparrows, and he

regarded *Sporopipes* as fairly close to the ancestral line of both Ploceinae and Estrildinae.

I still find it difficult to visualize a possible common ancestor for these two subfamilies. Sushkin considered the *Vidua* group to be fairly close to the Estrildinae, yet showing some rather primitive characters in their anatomy. I have always felt that the Viduinae, now commonly raised to subfamily rank, are closely allied to the Estrildinae, of which they appear to be always nest parasites. They share the curious mouth markings and gape wattles of nestlings, and these were not acquired independently, in my opinion, by the Viduinae through mimicry.

None of the characters that have been cited for the recognition of the Estrildidae is completely trenchant, and none is wholly constant. While it is true that the estrildines show no seasonal plumage dimorphism, which many of the ploceids do have, there are numbers of the latter group that agree in this respect with the waxbills. Among such examples may be cited such genera as *Amblyospiza*, *Bubalornis*, *Dinemellia*, *Histurgops*, *Malimbus*, *Passer*, *Petronia*, *Philetairus*, *Phormoplectes*, *Plocepasser*, *Ploceus* (many species, especially of the subgenera *Heterophantes*, *Hyphanturgus*, *Icteropsis*, *Melanoploceus*, *Melanopteryx*, *Otyphantes*, and *Xanthoploceus*, although many other species have marked seasonal plumages in the adult males), *Sorella*, *Sporopipes*, and *Symplectes*. As shown in my 1960 summary, the presumed behavioral differences are also not constant and therefore they cannot be looked upon as trenchant systematic criteria. It may seem that the point at issue is a very minor one—whether we have two closely related families or two subfamilies of one family—but the difference in the status of the two is supposed to reflect something of the closeness or remoteness of their relationship, and this is important.

The recognition of a separate family Estrildidae, based on admittedly "average," nontrenchant characters, would result in either of two unfortunate situations. If the viduines were to be included as a specialized subfamily of the waxbills, the supposed criteria of the family would break down completely. If the viduines were not included, but were left as a subfamily of the Ploceidae, they would then be separated systematically from the birds to which they seem most closely allied. The closeness of their affinity to the waxbills appears to be agreed upon by most students of the viduines—Chapin, Delacour, Friedmann, Sushkin, and others. For that matter, Steiner, who places them as a subfamily of the Ploceidae and recognizes a separate family for the waxbills and their relatives, admits that the widowbirds developed reflection globules and buccal patterns essen-

tially similar to their estrildine hosts, “. . . auf Grund wirklicher Verwandtschaft . . .,” and he considers the Viduinae as the section of Ploceidae nearest to the Estrildidae.

The immediate problem of uppermost concern to me was, and still is, how to interpret most cautiously and most accurately the parasitic breeding habit of the viduines, and it was obvious that to do so entailed an appreciation of the degree of their phylogenetic affinity to their chief hosts, the waxbills forming the estrildine group.

If the two groups, Viduinae and Estrildinae, were considered as closely related and as stemming from a common ancestral stock, the striking similarity in the mouth markings and reflection globules of their nestlings could be interpreted readily as something retained by both from the stock from which the two groups bifurcated. If, however, the two groups were looked upon as not so closely related and as not derived from a common ancestry, this important feature of their young would have to be treated as a parallel development, and quite probably as an adaptive one on the part of the parasitic Viduinae. This is, in fact, what Steiner concludes when he writes (translation mine) that “in the viduines, as a specialized small sub-family of the ploceines, we have nothing else but a case of true mimicry, which, in the imitation of the mouth markings, is not more astonishing than are other known examples in insects, snakes, and other creatures, and which have developed in the viduines in place of the complicated reflex behavior of nestlings of other brood parasites . . .,” such as the evicting behavior of young cuckoos of some species, and the deliberate and usually lethal attacks by newly hatched Indicators on their nest mates. Steiner expressly calls the mouth markings a “spermestid character” in the viduines, and he considers that in any evaluation of them a decisive role would have to be assigned to the thought that the viduines obtained or developed “through true relationship, in their 6 or 7 species, various distinct mouth-markings similar to those of their similarly distinguishable host species—*Pytilias*, *Granatinas*, *Lagonostictas*, and *Estrildas*. This would presume that each of their species had developed with its coordinated host species from a primitive form, which, in retrospect, must be assumed to have had a disclosed value for each presumed parasite-host pair of species.” As I pointed out in my account, this point of view has also been stated by Southern (1954), who accepted the opinion that the viduines were extremely specialized brood parasites, each species being practically an obligate parasite of a single species of estrildine host to which it was thought to be permanently

attached by virtue of a "very complicated form of mimicry. . . ."

The great difficulty in accepting this appraisal of the host-parasite situation lies in the fact that the several species of *Vidua* are not each rigidly restricted to single species of hosts. Of some of these birds our knowledge is still very scanty (or even wanting), but of others, such as *V. macroura* with 18 recorded kinds of hosts, *V. regia* with 7, *V. chalybeata* with 2, and *Steganura* with 9, the available data certainly contradict any postulated rigid host specificity. To account for the development of nestling mouth markings similar to those of the host species would necessitate, as Steiner himself outlined, a strictly limited host-parasite specificity, and this we do not find to be the case. It is true that each of the species of viduines does appear to have a single most-favored host, but the percentage of deviates from it is too great to ignore. Thus, of the best known species, *Vidua macroura*, I was able to assemble data on 77 records with 18 species of hosts, and of these more than three-quarters were of 10 species of waxbills of the genus *Estrilda* and more than half were of the races of a single species, *Estrilda astrild*. However, the different species of waxbills differ as much in their mouth markings among themselves as do the species of *Vidua*. If, as Steiner implies, the mimetic similarity of buccal patterns of each species of parasite and its normal host can only be looked upon as having an importantly selective survival value, we would expect a considerably higher adherence to the specific host relationship it is supposed to serve.

It might be considered that there may have been such a rigid host selection originally and that subsequently the parasites broadened their range of fosterers, but this would imply a subsequent denial of an original, and ostensibly a continuing, selective force. In view of the inconstant nature of the differences tabulated in support of familial rank for the waxbills, and in view of the great difficulties such an arrangement would make in interpreting the breeding biology of the widowbirds, I still think it better to keep them all in one systematic family group.

It has occurred to me that the above argument may make it seem that the conclusions arrived at may imply something akin to a manipulation of classification to simplify or to eliminate what would otherwise be a perplexing problem, rather than to maintain a systematic arrangement based purely on traditional characters, and to let the tangential problem continue to perplex us if need be. This is not the case, as the characters advanced by the proponents of familial rank for the waxbills are not constant, on the one hand, and the mouth

markings of the nestlings are also valid morphological characters in themselves. The fact that these buccal patterns may be functional as well as morphological, and hence to some extent possibly subject to the pressure of natural selection, need not rule out the possibility, the probability even, that they are also phylogenetically stable characters, useful as indicators of relationship. This idea is by no means novel at this point, nor was it in my 1960 discussion, where (p. 24) I pointed out that Morris (1957, p. 199) concluded that these mouth markings were conservative taxonomic characters and as such were useful aids to understanding the evolution of the birds that have them.

Nicolai (1961) has recently published in abbreviated form the results of a study of the vocalization of several species of *Vidua* under aviary conditions. He studied with a tape recording the sounds produced by *V. macroura*, *V. regia*, *V. chalybeata*, and *Steganura paradisaea* and reported that part of the notes of each was a fairly accurate copy of the song of their host species. He stated that the viduine sounds comprised a "weaverbird-like" series of notes, scarcely distinguishable in the four species, and a series of loud notes and songs of the respective host species (various species and races of *Estrilda*). Nicolai found in the ploceids and estrildids closest to the viduines all songs and notes to be consistently innate and nonvariable, and he concluded that probably the notes of the viduines were similarly somewhat "fixed." He went on to speculate that the young Viduinae probably acquired their vocabulary from their foster parents during their period of dependency in and out of the nest. Only in this way did he think the exclusive reproduction of the vocabulary of the particular host species could have been made possible. Furthermore, he pointed out that in the case of *V. macroura*, which is known to parasitize a number of species of *Estrilda*, each male had invariably only the notes of one host species. There were no cases of mixed songs, a fact which he considered in agreement with his premise as to how the imitative process could have taken place. On the other hand, Nicolai further contended that the "whispering nest notes" of the male, which appear in the vocalization of *V. regia* and *V. chalybeata*, were learned somewhat later, after the birds had become self-sufficient and no longer were in constant contact with their fosterers, when the latter began preparing to breed again and began nest building anew.

Nicolai further concluded that whereas, at the close of the period of parental dependency, the young of other, self-breeding, passerines

might go through what seemed like playing at nest building or playing at heterosexual pursuit, the young parasitic widowbirds were interested in watching the breeding preparations of their fosterers. The precise observations they made and the degree to which they seemed to incorporate these impressions were thought to become important later in their lives in helping to synchronize their reproductive cycles and activities with those of their hosts, and so to become significant in the breeding success of the widowbirds.

Inasmuch as Nicolai's work has not yet been published with sufficiently detailed documentation, it is somewhat difficult to appraise and to criticize his conclusions. The following comments must be read with this in mind, and some doubts that are raised here may prove to be baseless. I must stress that the observations, surprising as they seem to me, merit serious and respectful consideration. Their interpretation seems to be less certain.

For one thing, in a state of captivity birds may sometimes do things they would have little chance of doing or, as far as we know, do not do, in a wild state. I do not know whether Nicolai's birds had the presumed fosterers with them in the cage or in nearby cages where they could hear them. If they were not actually raised in captivity by these fosterers, one wonders how Nicolai could know which was the foster parent species in each instance, unless he assumed the most likely one from the total recorded literature (as was brought together in my book), or unless he assumed the identity of the host from the vocabulary of the parasite. The latter would be a matter of circular reasoning which would hardly be convincing, and which I cannot believe was done. Yet this was the way in which some of Neunzig's original (1929) conclusions seem to have been achieved.

I am wholly convinced that it is possible to learn many things, including vocalizations, from captive birds that it would be very difficult to learn in the free state, but I am still surprised that no one ever reported any constant and marked specific differences in the notes of the various species of *Vidua* in Africa. Although my own fieldwork is now many years past, and I do not pretend to remember accurately the songs and calls of these birds, I can find no mention in my journals of any marked differences between them, and I have found no published observations of others to this effect. This suggests that the differences noted in aviary birds are not sufficiently striking to be obvious in the field but require close-up observation for their discrimination. As a matter of fact, the vocali-

zations of the various host species of the genus *Estrilda*, as described in the literature, are all quite similar, or at least their specific patterns vary only slightly among themselves. This does not mean that the differences are less real, but I cannot dispell the thought that these portions of the songs resembling the notes of the presumed host species may have been due to the limiting conditions of the aviary, whereas the "weaverbird-like" notes common to all four species agree with what is known of their calls in the state of nature.

The very abbreviated form in which Nicolai's data were reported caused them to appear to imply further evidence for a definite host-parasite relationship, but this is not actually implicit in them. We are not informed how many individuals of each species of viduine were observed or under what conditions. Thorpe's (1958) work on the learning of song patterns by small passerine birds, especially the chaffinch, has indicated that the learned, as opposed to the innate, pattern of song is restricted to the "first 13 months of life and towards the end of this time there is a peak period of learning activity of a few weeks during which a young Chaffinch may learn, as a result of singing in a territory, the fine details of as many as six different songs." If Nicolai's assumption is correct, that the young parasitic widowbirds learn the utterances of their foster parents during the first two or three weeks of life, they are apparently more precocious than chaffinches in this respect. Furthermore, we may recall that in the case of parasitic cowbirds and cuckoos there is no sign whatever of the young learning any of the vocalisms of their fosterers. This cannot be looked upon as meaning that the same situation necessarily is true for the parasitic weavers, but judgment must be delayed until evidence is forthcoming. If eventual fuller publication of Nicolai's work should convince us that the viduines enhance their reproductive potential even very slightly by vocal mimicry of their common hosts, we would have to admit an unexpected uniqueness in these birds.

Another study that appeared too late for me to discuss in my account was Ziswiler's (1959) paper on features of the ontogenetic development of the waxbills. While presenting some data on the relative lack of sensitivity of later developmental stages to increasingly long interruptions of brooding, and also some data on the postembryonic (i.e., nestling) growth curves of several species, Ziswiler does not concern himself with the viduines at all; he does not even mention them. His paper therefore gives us no opinions to eval-

uate in the present connection. He does consider the waxbills a systematic family, but he gives no arguments or data either supporting or contradicting this treatment. The data he does present are not given as systematic criteria and show nothing peculiar to the "Spermestidae."

The problem as to which of the numerous described species or races of the combassous are really valid still awaits an answer based on much more extensive and more complete knowledge of them in the field. From my own field studies of many years ago and from much more recent examination of large numbers of museum specimens I arrived at the arrangement given in my 1960 publication. However, almost simultaneously, Wolters (1960) proposed a somewhat different treatment, based in part on observations of aviary birds. These differences are not particularly important, as no one has the data on which to formulate a completely convincing and wholly satisfying classification, but they do point out that until such information is assembled, all our judgments can have only limited validity. In our understanding of the combassous, as contrasted with the present knowledge of the long-tailed viduas, we are still confronted with the species of the systematists rather than the species of the naturalists. This is bound to continue until the living birds are studied much more thoroughly, as further examination of their preserved corpses will only lead to divergent and inconclusive arrangements.

Still more recently, Wolters (1961) has published an arrangement of the viduines in which the short-tailed species (subgenus "*Hypochera*") are placed at the top, whereas I put them at the base of the group. Wolters considers the absence of elongated rectrices in the breeding plumage of adult males to be a secondarily arrived at condition, and that the long-tailed species (subgenus *Vidua* proper) are to be looked upon as representing the original, ancestral character of the group. Also, he suggests that *Steganura* is the basic or primitive member of the viduines, whereas I placed it at the apex of the assemblage. While it is obvious that each of us came to our respective conclusions on the basis of all the evidence we could muster, it now becomes clear that, in the absence of any really conclusive data, these alternate, and, in fact, opposite, arrangements can only be looked upon as interpretations of the purely circumstantial evidence afforded by the appearance and the habits of the existing species. Actually the two classifications agree closely in the relative placement of the included species and genera, but differ in their overall orientation.



In defense of the arrangement proposed in my book I can only repeat here what I outlined there, namely, that inasmuch as rectricial elongation in male nuptial plumage is a character that has developed wholly independently in two of the main groups or sections of the family, it seems probable that within each of these groups the short-tailed species are nearer the stock from which they evolved than are their long-tailed relatives. There is nothing in the life histories of the short-tailed species to suggest that they are in any way more advanced than their congeners with elongated rectrices; in fact, the reverse is more in keeping with our still all too incomplete information. The courtship antics of the combassous are simpler, less involved, apparently more primitive than are those of the long-tailed species. All the viduines are quite similar in their vocalisms and, except for size (in *Steganura*), in the appearance of their eggs. It is perhaps a necessary commentary on so much of our present avian systematics to end this discussion with the observation that the one point of agreement in all these attempts is that we need to know more about the birds themselves.

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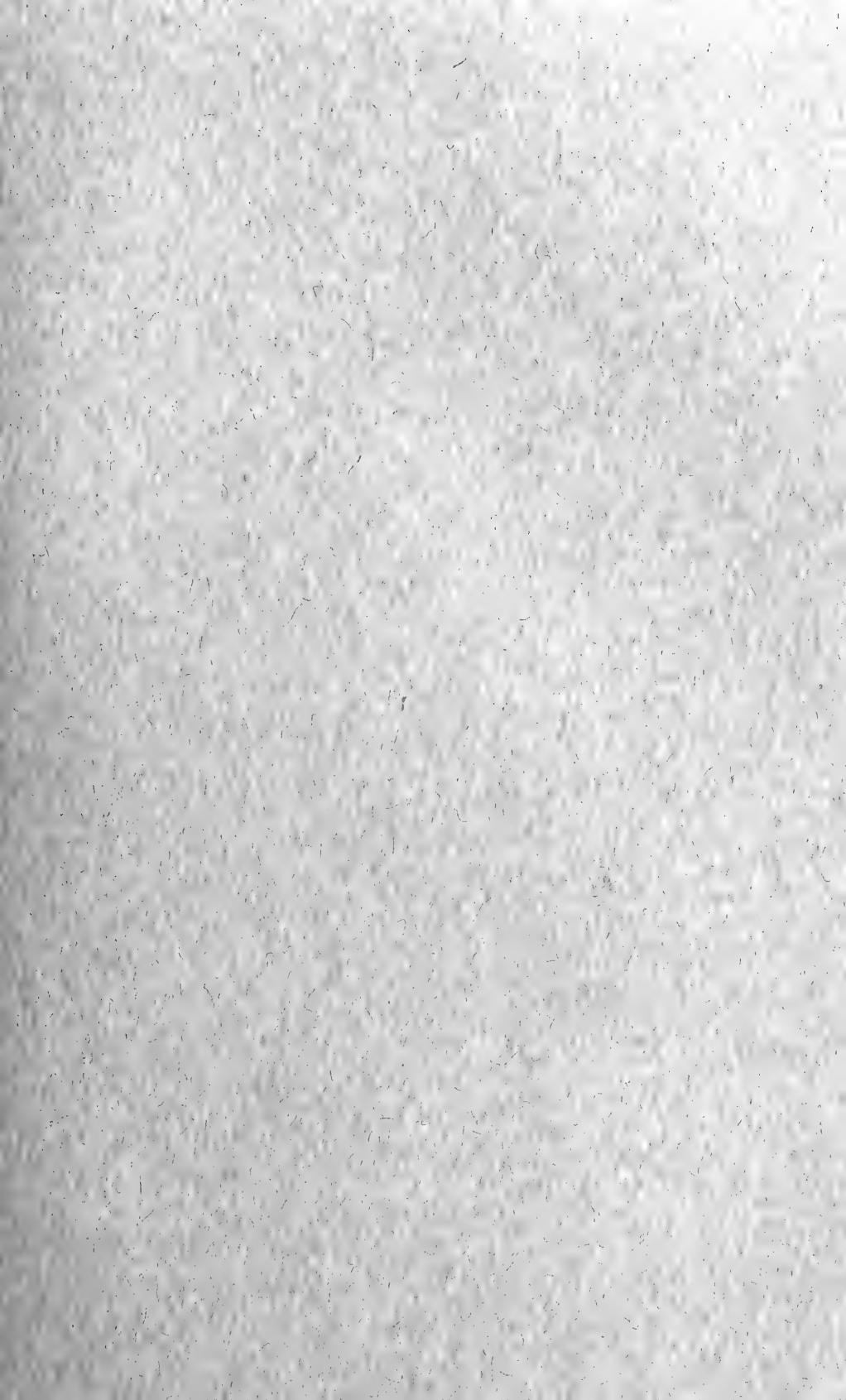
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# ADDITIONS TO RECORDS OF BIRDS KNOWN FROM THE REPUBLIC OF PANAMÁ

By ALEXANDER WETMORE  
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THE notes that follow, pertaining to recent studies on avian collections made in Panamá, include descriptions of two species and two geographic races not known previously. The two named from Darién are based on specimens received from the Gorgas Memorial Laboratory in Panamá and derive from recent field work directed by Dr. Pedro Galindo. Included with these are further records of birds from the little-known island of Escudo de Veraguas, located 18 kilometers at sea off the base of the Valiente Peninsula, Bocas del Toro, and report of two North American migrants not found previously in the republic.

## I. ADDITIONAL RECORDS FROM ISLA ESCUDO DE VERAGUAS, WITH DESCRIPTION OF A NEW SPECIES OF HUMMINGBIRD

In the course of a visit to Isla Escudo de Veraguas early in March 1958, I collected a thick-spined rat (genus *Hoplomys*), the first island record for this group, and a race that proved to be new to science (Handley, 1959, pp. 9-10). Following its description, Dr. C. O. Handley, Jr., of the U. S. National Museum, through cooperation of the U. S. Army, came to the island in 1962 and lived there in a shore camp from March 20 to 24. In addition to a series of the rat, and many bats, he preserved in formalin a number of birds caught in mist nets, and prepared a few others, shot for specimens, as study skins. The 41 birds collected have added considerably to earlier information on the avifauna, available from my own brief visit four years earlier (Wetmore, 1959, pp. 1-27).

Migrants recorded by Dr. Handley include several that had not been listed from the island previously. A belted kingfisher, taken March 21, is the eastern subspecies *Megaceryle alcyon alcyon*. Several eastern wood pewees (*Contopus virens*) were present and

in song on March 23, when one was taken for a skin. Several small groups of barn swallows passed on this same day, moving toward the north. On March 21 single purple martins were reported at intervals during the day in northward flight off shore. One was recorded on March 19 on the airstrip at Fort Sherman, Canal Zone, and another was observed March 20 at sea about 15 kilometers off the mouth of Rio Belén, on the boundary between the provinces of Colón and Veraguas. Swainson's thrushes (*Hylocichla ustulata*), taken March 21 and 24, and a red-eyed vireo (*Vireo olivaceus*), on March 23, are identified to species only, as they were placed in formalin. Other migrants, all in formalin, include the black-and-white warbler (*Mniotilta varia*), on March 22, and the prothonotary warbler (*Protonotaria citrea*), worm-eating warbler (*Helmitheros vermivorus*), ovenbird (*Seiurus aurocapillus*), and northern waterthrush (*Seiurus noveboracensis*), taken on March 21. A male summer tanager (*Piranga rubra rubra*) in full breeding plumage, prepared as a skin, was collected March 21, and another was recorded on the day following.

An immature yellow-crowned night heron, another addition to the island list, appears to be the resident race of Panamá, *Nyctanassa violacea caliginis*, while a single green heron (*Butorides virescens*), seen March 20 and 21, was believed to be a migrant. A pair of pygmy kingfishers (*Chloroceryle aenea aenea*) caught in mist nets set up near the lagoon March 24, form an interesting addition to the island residents. Men with me in 1958, and those with Handley, saw a small rail that was not collected, but from the description it may have been the white-throated rail (*Laterallus albigularis*) which is common on the mainland. George Barratt, with Handley, also reported a night bird with batlike flight that probably was a species of goatsucker.

Specimens in formalin of the endemic races of the manakin, *Manacus vitellinus amitinus*, bay wren, *Thryothorus nigricapillus odicus*, and blue-gray tanager, *Thraupis virens caesitia*, all show clearly the decidedly larger size of the first two, and the heavier bill found in the tanager when compared to birds of the adjacent mainland. The same character of larger dimension is present in the island form of the thick-spined rat, described by Dr. Handley, and is in much greater evidence in the hummingbird, whose description follows.

## AMAZILIA HANDLEYI, new species

*Characters.*—In general appearance similar to *Amazilia tzacatl tzacatl*<sup>1</sup> but much larger, and darker in color; bill decidedly heavier; feet larger; brown of tail, upper and under tail coverts, and lores, darker; back and wing coverts decidedly darker and duller.

*Description.*—Type, ♂ ad., U. S. Nat. Mus. 477282, from Isla Escudo de Veraguas, collected March 22, 1962, by C. O. Handley, Jr., and F. M. Greenwell (orig. no. 1188). Crown, hindneck, back, and wing coverts (except the primary coverts) deep green, with a sheen of dull bronze that changes on lower back and rump to a darker shade with an iridescence of dull russet; upper tail coverts liver brown; tail chocolate, edged and tipped with dull black; primaries, secondaries, and primary coverts dull black with a faint sheen of violet; a narrow line of chocolate on the lores; foreneck, sides of neck, upper breast, and sides clear bright green, with some of the throat feathers edged narrowly with dull white; a small tuft of white feathers on the upper line of the sides near center; lower breast and upper abdomen hair brown; lower abdomen and tibial tufts white; under tail coverts walnut brown; edge of wing lined narrowly with chocolate. Tips and sides of maxilla and tip of mandible dull black; rest of bill dull reddish brown; bare lower end of tarsus, toes, and claws dull black. (From dried skin.)

*Measurements.*—Males (4 specimens), wing 67.5-68.7 (68.1), tail 40.0-41.5 (40.6), culmen from base 24.4-27.6 (24.5) mm.

Female (one specimen), wing 67.1, tail 41.1, culmen from base 25.8 mm.

Type, male, wing 67.5, tail 40.0, culmen from base 27.6 mm.

*Range.*—Confined to Isla Escudo de Veraguas, off the base of Peninsula Valiente, Bocas del Toro, Panamá.

*Remarks.*—During my visit to Escudo de Veraguas early in March 1958 I had brief glimpses of hummingbirds at flowers among low bushes back of the beach, but none came sufficiently near to allow me to shoot any for specimens. As they turned in flight I had brief glimpses of brown in the tail as in Rieffer's hummingbird (*Amazilia t. tzacatl*) common on the mainland, and these Escudo birds were so identified and recorded (Wetmore, 1959, p. 6). During the work of Dr. Handley five were captured in mist nets set for bats, and with these in hand it was obvious immediately that while they

<sup>1</sup> *Trochilus Tzacatl* De la Llave, Registro Trimestre, vol. 2, no. 5, Jan. 1833, p. 48. (México.)

resembled Rieffer's hummingbird in color pattern, they were so much larger, especially in bulk of body and total length, and also so much darker colored, that they were examples of an unknown form. From careful examination the differences are of such a nature that they must be considered as representative of a distinct species. This is named for Charles O. Handley, Jr., in recognition of his continuing interest in the avifauna during his field work concerned with the mammals of Panamá.

The five birds taken by Dr. Handley were preserved in formalin and were prepared as skins by Mrs. Roxie Laybourne on their arrival at the U. S. National Museum. Their much greater size was obvious, but to make certain that the color differences were not due to the preservative I placed a recently taken study skin of *Amazilia tzacatl* in the same fluid in which the hummingbirds from Isla Escudo de Veraguas had been received. When dried after a month of such immersion this specimen showed no change of any kind. It is interesting to record that in this skin, and in the larger relative here described, the feathers along the side of the neck when wet were metallic reddish purple, a color that disappeared completely as the specimens dried.

*Amazilia tzacatl* as a species maintains uniform size, within the usual limits of individual variation, throughout a vast area from eastern México, Central America, and Colombia to western Ecuador and western Venezuela. The only variation apparent is in a buffy wash on the abdomen in that part of the population found in southwestern Colombia and Ecuador on which birds of that section are separated as a geographic race under the name *A. t. jucunda*. It has been noted above that the bird of Isla Escudo de Veraguas compared with *tzacatl* differs in decidedly darker coloration and in much larger size. It is clearly evident that the island group is of a stock similar to that of the mainland, so that on first consideration it would appear that they should be related as subspecies. The color differences, while considerable, would not militate against this. But the size difference in terms of bulk of body of the island bird is so much greater—over 50 percent more than that of the mainland group—with its complete isolation, make it reasonable to regard *handleyi* as a separate species.

As stated in my earlier paper (Wetmore, 1959, pp. 3-4) it is probable that the island had connection with the mainland during the fluctuations in sea level of Pleistocene time so that the present inhabitants among birds and mammals may have come to it during

such periods. It is interesting that the hummingbird, the manakin, the wren, and the rat all differ from present-day mainland relatives in definitely greater size. In the tanager this distinction is also evident but is restricted to the bill. Perhaps this species has come to the island more recently than the others.

## II. DESCRIPTIONS OF A WOOD-QUAIL AND A TYRANT FLYCATCHER FROM THE SERRANÍA DEL DARIÉN

During part of June and July 1963, the Gorgas Memorial Laboratory, under arrangements directed by Dr. Pedro Galindo, established three camps in the Serranía del Darién, in the vicinity of Cerro Tacarcuna, to serve as bases for the investigation of this little-known area. The birds collected included specimens of a beautiful wood-quail, related to Andean mountain forms to the south but unlike any of those known, and a flycatcher of a South American species not recorded before from Panamá. Descriptions of these follow.

### Family PHASIANIDAE

#### ODONTOPHORUS DIALEUCOS, new species

*Characters.*—Generally similar to *Odontophorus strophium* (Gould)<sup>2</sup> but with crown black; back and scapulars without white shaft lines; entire upper surface olive, with rufous only as a band on the hindneck; foreneck similar in the two white bands above and below, with the space between mixed black and dull rufous; rest of lower surface olive rather than rufous and cinnamon, without shaft lines or a black collar below the lower white band; breast, sides, and flanks dull olive-buff, finely barred and mottled with slaty black.

*Description.*—Type, ♂, U.S. Nat. Mus. 483327, from 1,450 meters elevation, 6½ kilometers west of the summit of Cerro Malí, Darién, Panamá, taken June 7, 1963, by Pedro Galindo (orig. no., Gorgas Mem. Lab. 4-00384): Crown black with slight, partly concealed mottling of dull rufous, and tiny spots of white; a prominent white superciliary streak that extends back of the eye; a band of hazel mottled and lined with sooty black on the hindneck that laterally becomes cinnamon-buff as it extends around to meet the posterior end of the white superciliary; back, rump, and upper tail coverts brownish olive, finely barred and mottled with sooty black, with scattered faint spots and indistinct bars of cinnamon; wing coverts, inner secondaries, and

<sup>2</sup> *Ortyx* (*Odontophorus*) *strophium* Gould, Proc. Zool. Soc. London, vol. 11, 1843. (March, 1944), p. 134. (Bogotá, Colombia.)

tertiaries snuff brown, barred and spotted finely with sooty black, and lined and spotted sparingly with small, irregular marks of buffy white; tertials with heavy, irregular markings of black, inner secondaries barred broadly with black; primaries fuscous, finely mottled with dull cinnamon-buff on outer webs; a band of white across the upper fore-neck extending at either side over the malar region beneath the eye, and on the lower eyelid; a broad band of black mixed with Mars brown and russet extending between the two white bands from the lower cheeks across the middle foreneck and upper throat, changing to dull black over the ear coverts; a broad band of white across the lower foreneck; rest of lower surface dull buffy brown to tawny-olive, heavily mottled with sooty black, spotted sparingly and indistinctly with buffy white, becoming Saccardo's umber, with slightly heavier markings of black and cinnamon-buff on the flanks and under tail coverts; under wing coverts fuscous, sparingly and indistinctly spotted with dull Saccardo's umber. Bill, tarsi, and toes black (in dried skin).

*Measurements.*—Male (type), wing 129.5, tail 44.3, culmen from base 19.8, tarsus 45.2 mm.

Female, wing 131.0, tail 46.7, culmen from base 19.6, tarsus 47.5 mm.

*Remarks.*—The male and female from which this bird is described were taken together. The adult female is very slightly browner than the male. This specimen has the lores and the superciliary area black like the crown, with only a fine spotting of white. The chin also seems to have had the white band considerably reduced by black (though this can not be ascertained clearly as some of the feathers of this area are missing.) The line of the culmen and the tip of the maxilla in this bird are partly brown.

The discovery of this beautiful wood-quail, isolated in the higher levels of the Serranía del Darién, adds another form to populations of this genus with prominent markings of white on the head and neck. It is most like *Odontophorus strophium* of the Bogotá region of Colombia, which has the foreneck similar, with a black center bordered broadly with white above and below. This species differs, however, in the presence of a narrow black collar on the neck below the border of the lower white band. Also *strophium* is rufous and cinnamon on the breast and sides, with prominent white shaft lines and spots, has the crown fuscous-brown, and the whole upper surface rufescent rather than olive, with heavier, more prominent markings. *Odontophorus columbianus* (Gould) of the subtropical zone of the mountains of northern Venezuela in general resembles *strophium* but has

the entire foreneck white above the narrow basal black collar. Also it is spotted along the sides with black, and heavily with white on the breast. *Odontophorus parambae* Rothschild, found in the tropical zone from west-central Colombia south to Ecuador, has a single white band across the lower area of the black foreneck. *Odontophorus leucolaemus*, more remote, in Costa Rica and western Panamá, has the entire upper foreneck white, with the lower area and upper breast jet black. And finally there may be noted *Odontophorus atrifrons* of the Andes of northern Colombia and *O. erythrops melanotis* found on Cerro Pirre and Cerro Azul in Panamá, in which the foreneck is solid black.

All these are similar in size, form, and, so far as known, in habits, so that it is reasonable to postulate common ancestry. Their present-day differences in pattern of markings, coupled with variations in color, may unite them in a super species, but these distinctions appear so fixed and so definite that to group them as subspecies under one specific name would conceal their interesting divergences.

The name for the species here described is from the Greek *dialeukos*, marked with white.

#### Family TYRANNIDAE

##### ELAENIA CANICEPS ABSITA, new subspecies

*Characters*.—Male, similar to that of *Elaenia caniceps parambae* (Hellmayr)<sup>3</sup> but lighter, clearer gray above and across the breast; whiter on throat and abdomen; partly concealed white area of center of crown larger; white edgings on lesser wing coverts more extensive. Female, with pileum darker gray (around the white center); breast, sides, and abdomen decidedly paler, less deeply yellow.

*Description*.—Type, ♂, U.S. Nat. Mus. 483342, from the old Tacarcuna Village site, headwaters of the Río Pucro, 950 meters elevation, on the base of Cerro Malí, Serranía del Darién, collected by Pedro Galindo, July 4, 1963 (orig. no., Gorgas Mem. Lab. 3-00329). Crown deep neutral gray, with an extensive, partly concealed central area in which the basal two-thirds of each feather is pure white; a narrow line of grayish white across forehead and upper edge of lores; back, rump, and upper tail coverts neutral gray; wings black, with the wing coverts tipped, and the inner primaries, secondaries, and tertials broadly edged with white; tail feathers mouse gray edged with neutral gray, mainly toward base, and tipped narrowly with grayish white;

<sup>3</sup> *Serpophaga parambae* Hellmayr, Bull. Brit. Orn. Club, vol. 14, Feb. 27, 1904, p. 54. (Paramba, elevation 3,500 feet, Provincia de Esmeraldas, Ecuador.)

a very narrow line of white on the edge of both eyelids; lores, side of head below eye, and anterior auricular feathers neutral gray at the tips and more or less white at the base; throat and upper foreneck very pale grayish white; lower foreneck, upper breast, and sides pallid neutral gray; flanks, abdomen, and under tail coverts pure white; edge of wing white with a slight spotting of neutral gray; inner wing coverts and edge of inner webs of primaries white; outermost wing coverts white mixed with neutral gray. Bill dull black, with the base of the gonys whitish; tarsus, toes, and claws black. (From dried skin.)

*Measurements.*—Male, type, wing 58.0, tail 49.4, culmen from base 10.5, tarsus 15.5 mm.

Female, wing 52.5, tail 42.8, culmen from base 10.2, tarsus 15.6 mm.

*Range.*—Known only from the upper Río Pucro, at 950 meters elevation on the base of Cerro Malí, Serranía del Darién, Panamá.

*Remarks.*—A female, U.S. Nat. Mus. 483341, was taken with the male at the same location, on July 4, 1963 (Gorgas Mem. Lab. no. 3-00328). This bird has the following colors: Crown slightly darker than in the male, with the same partly hidden white center; upper surface Krönberg's green; tail feathers blacker than in the male, edged lightly with dull green; light edgings on wing chartreuse yellow; side of head as in male; throat and upper foreneck duller white; lower foreneck, breast, and sides washed lightly with vetiver green; abdomen sea-foam green; under tail coverts chalcidony yellow; lighter part of under wing coverts, and inner webs of basal part of primaries like abdomen.

The male has been compared with the type of *Elaenia c. parambae* in the American Museum of Natural History. Through the kindness of James Bond I have examined a female and two males of that race in immature dress in the Academy of Natural Sciences of Philadelphia, taken on the Río Jurubidá, inland from Nuquí near the central coast of the Department of Chocó, northwestern Colombia. The two marked male in color are like the female. Compared with the female from Cerro Malí the three from Nuquí are very slightly clearer green on the back, with the base color of the crown faintly lighter gray. Below they differ decidedly as the throat and upper foreneck are duller, grayer, the lower foreneck, breast, and sides are much greener, and the rest of the under surface is decidedly deeper yellow.

The specimens from the Cerro Tacarcuna massif in Darién mark an interesting addition to the flycatchers known from Panamá. As a species, *Elaenia caniceps* ranges from Colombia and southern Venezuela to Bolivia, northern Argentina, and southern Brazil. With the present description four subspecies are recognized in this area.



The name of the present race, the most northern population known, is taken from the Latin *absitus*, in the sense of one living remote or distant from its relatives.

### III. A WESTERN SUBSPECIES OF THE PLAIN-COLORED TANAGER

The plain-colored tanager, in its subspecies *Tangara inornata languens* Bangs and Barbour, is a common bird of the tropical zone in Panamá from the central lowlands eastward into Colombia. Through recent work of the Gorgas Memorial Laboratory at a field station in Bocas del Toro, I have received from Eustorgio Méndez three specimens from Almirante that mark a considerable extension of range. These prove to represent an undescribed race.

#### TANGARA INORNATA RAVA, new subspecies

*Characters.*—Similar to *Tangara inornata languens* Bangs and Barbour,<sup>4</sup> but with throat, lower breast, abdomen, and under tail coverts light buff to pinkish buff; a faint wash of the same color on lower rump and upper tail coverts; lesser wing coverts decidedly darker blue.

*Description.*—Type, ♂, U.S. Nat. Mus. 483344, from Almirante (Milla 2), Bocas del Toro, Panamá, collected August 23, 1963, by Eustorgio Méndez (orig. no., Gorgas Mem. Lab. 6936). Dorsal surface from crown to upper tail coverts neutral gray; wings and tail sooty black; lesser wing coverts methyl blue to Paris blue, with a metallic sheen; sides of head like crown, with the feathers of the ear coverts with faint grayish white shaft lines; chin sooty gray; foreneck pale olive-buff; chest and sides pale neutral gray; center of breast, abdomen, under tail coverts, and axillars pale pinkish buff to pinkish buff. Bill, tarsus, toes, and claws black. (From dried skin.)

*Measurements.*—Male (one, the type), wing 69.7, tail 45.4, culmen from base 10.9, tarsus 17.8 mm.

Female (two specimens), wing 65.4, 68.0, tail 43.6, 43.7, culmen from base 10.9, 11.0, tarsus 17.1, 17.2 mm.

*Range.*—Western area of the Province of Bocas del Toro in the Caribbean lowlands of Panamá; probably extending on the Caribbean slope in Costa Rica.

*Remarks.*—The well-known race *Tangara inornata languens* of this tanager has been recorded in Panamá on the Pacific slope west through

<sup>4</sup> *Tangara inornata languens* Bangs and Barbour, Bull. Mus. Comp. Zoöl., vol. 65, Sept. 1922, p. 227. (Lion Hill, Canal Zone, Panamá.)

the Canal Zone to Chorrera in the western sector of the Province of Panamá. On the Caribbean side I have taken it in the valley of the Río Indio west to El Uracillo, in northern Coclé, and Chilar in western Colón. In the American Museum of Natural History there is one from "Cascajal, Coclé" collected February 5, 1889. No collector is indicated, but the label and writing are those of Heyde and Lux, whose locality is believed to have been on the Caribbean slope on the Río Cascajal, a tributary of the Río Coclé del Norte.

The first specimen from Bocas del Toro, an immature female, taken in a mist net and prepared by Rudolfo Hinds, December 16, 1960, marked a considerable extension of range. The prominent buff of the under surface of this bird, which attracted immediate attention, was attributed at the time with some uncertainty to the age of the specimen, though this color did not agree with that found in other young birds of this species that I had seen. A second skin from Almirante, an adult female, taken September 25, 1962, was as deep buff as the first one, and with the receipt of an adult male secured August 23, 1963, it was apparent that a racial difference was indicated.

Approximately 75 skins of the race *languens* and 40 of *T. i. inornata* from central and eastern Colombia have been available for comparison. A faint wash of pale pinkish buff on the center of the abdomen and the under tail coverts is found in a number of these specimens, but in none is this color prominent as it is in the skins from Bocas del Toro. It is most evident in a few skins taken a hundred years ago by McLeannan in which this color seems due in part to discoloration from age as museum specimens. In all individuals in these long series the lesser wing coverts are light blue, with no approach to the darker color of this area in the birds from Bocas del Toro.

It is probable that the race described here ranges beyond the international boundary in the lowlands of the Caribbean slope of Costa Rica. While no specimens are available at this time, Dr. Paul Slud informs me that he has a few records of *Tangara inornata* (which he will publish in detail later) from that area.

The name is from the Latin adjective *ravus*, in the sense of tawny.

#### IV. ADDITIONS TO THE RECORDED LIST OF BIRDS FROM THE REPUBLIC OF PANAMÁ

Knot, *Calidris canutus rufa* (Wilson): Two immature males taken at Puerto Obaldía, San Blas, on September 12 and 22, 1934, by Hasso von Wedel are the only present report for this species. The specimens, originally in the Herbert Brandt collection at the Museum of the Uni-

versity of Cincinnati, are now in the U.S. National Museum. In the period of northern winter the knot, which nests in the far north, is found from eastern United States south to Tierra del Fuego. There are, however, few records of it in Central America.

Caspian tern, *Hydroprogne caspia* (Pallas): In the files of the U.S. Fish and Wildlife Service there is record of one banded by L. Tyler on South Limestone Island, in Georgian Bay, Lake Huron, Ontario, on June 11, 1955, that was found wounded at Aligandí, San Blas, on the evening of November 12 of that year. According to the report, forwarded by Dr. Alcibiades Iglésias, the bird died the following day. The occurrence on the San Blas coast is one to be expected, as this tern is reported as a migrant to the Caribbean coast of Colombia from Cartagena to the lower Río Magdalena.

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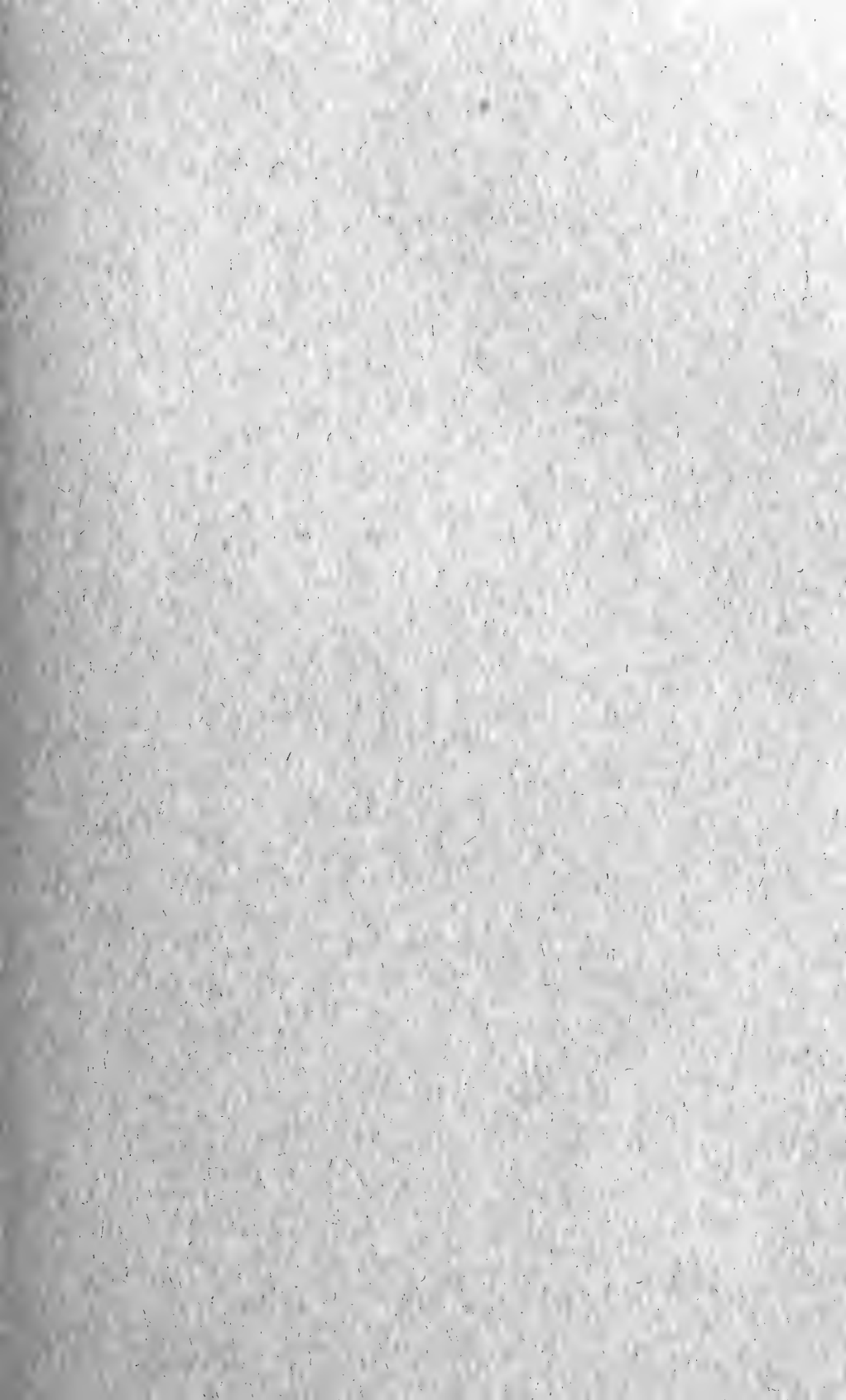
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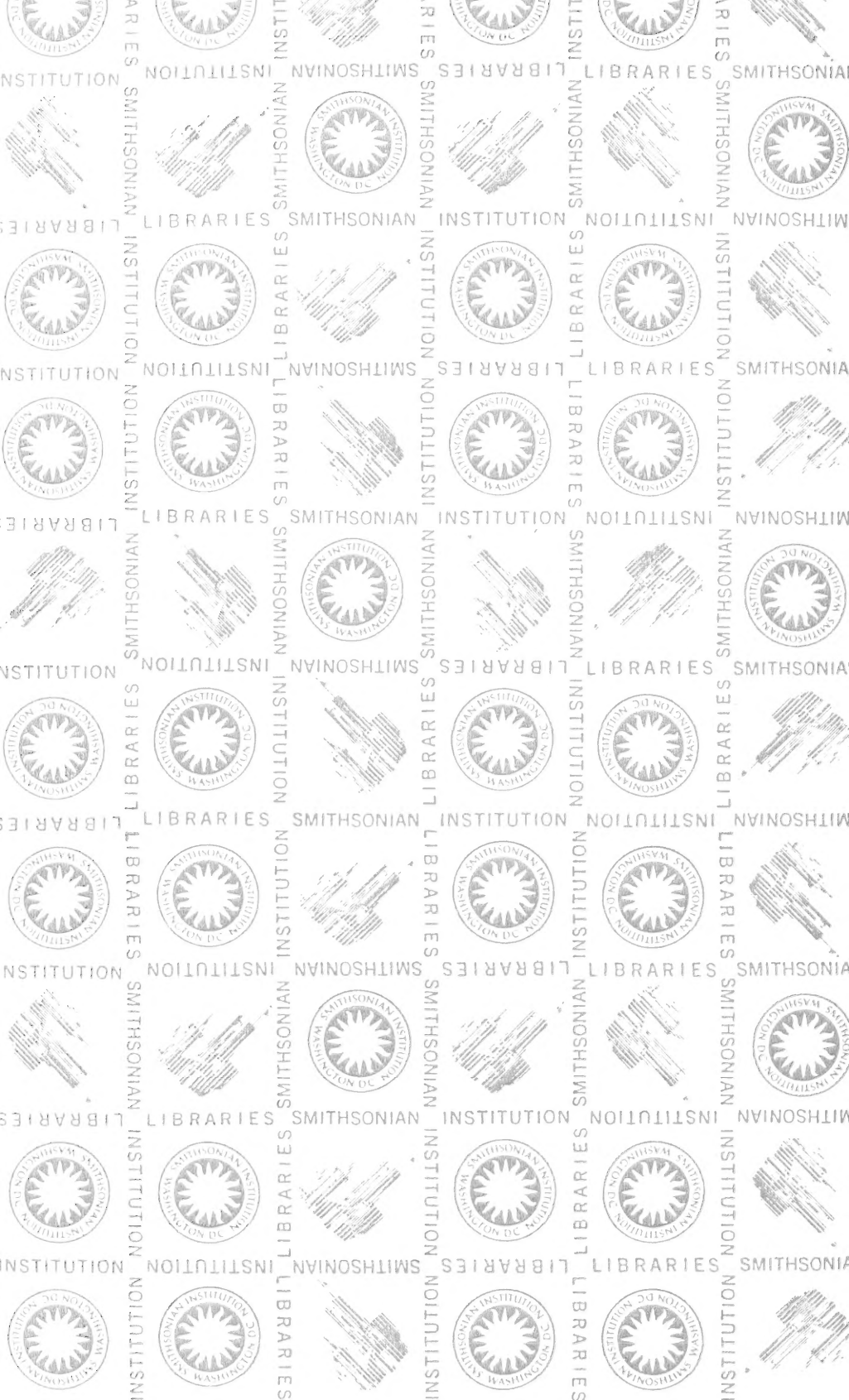


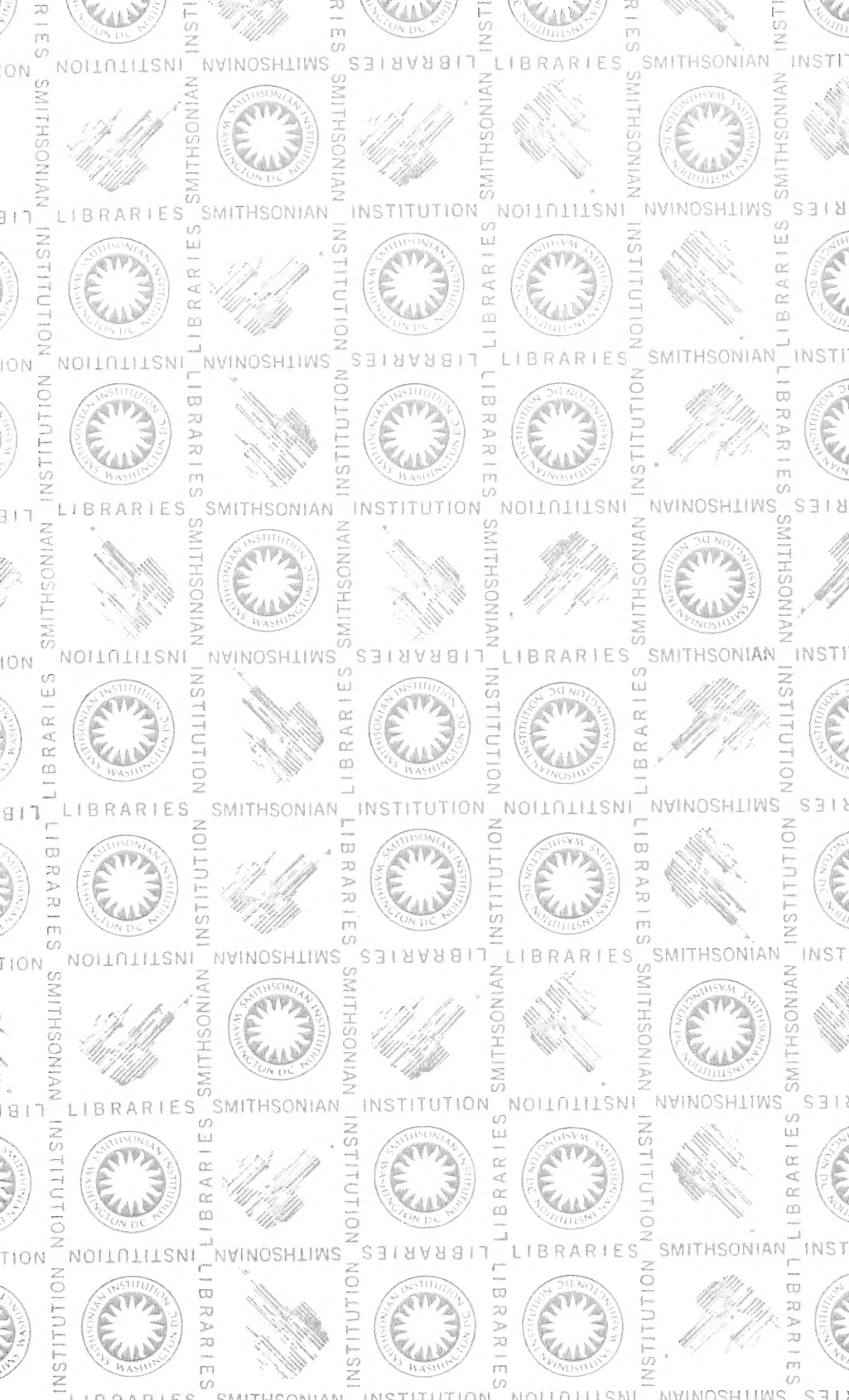












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